Internal Use Only

Service Manual

LG-E730

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1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services.

System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common carrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the phones or compatibility with the net work, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on the phones must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

A phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the  **sign.**

Following information is ESD handling:

• Service personnel should ground themselves by using a wrist strap when exchange system boards. • When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.

• Use a suitable, grounded soldering iron. • Keep sensitive parts in these protective packages until these are used.

• When returning system boards or parts like EEPROM to the factory, use the protective package as described.

1.3 Abbreviations

For the purposes of this manual, following abbreviations apply:

APC	Automatic Power Control
BB	Baseband
BER	Bit Error Ratio
CC-CV	Constant Current – Constant Voltage
DAC	Digital to Analog Converter
DCS	Digital Communication System
dBm	dB relative to 1 milli watt
DSP	Digital Signal Processing
EEPROM	Electrical Erasable Programmable Read-Only Memory
ESD	Electrostatic Discharge
FPCB	Flexible Printed Circuit Board
GMSK	Gaussian Minimum Shift Keying
GPIB	General Purpose Interface Bus
GSM	Global System for Mobile Communications
IPUI	International Portable User Identity
IF	Intermediate Frequency
LCD	Liquid Crystal Display
LDO	Low Drop Output
LED	Light Emitting Diode
OPLL	Offset Phase Locked Loop

PAM	Power Amplifier Module
PCB	Printed Circuit Board
PGA	Programmable Gain Amplifier
PLL	Phase Locked Loop
PSTN	Public Switched Telephone Network
RF	Radio Frequency
RLR	Receiving Loudness Rating
RMS	Root Mean Square
RTC	Real Time Clock
SAW	Surface Acoustic Wave
SIM	Subscriber Identity Module
SLR	Sending Loudness Rating
SRAM	Static Random Access Memory
PSRAM	Pseudo SRAM
STMR	Side Tone Masking Rating
TA	Travel Adapter
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UART	Universal Asynchronous Receiver/Transmitter
VCO	Voltage Controlled Oscillator
VCTCXO	Voltage Control Temperature Compensated Crystal Oscillator
WAP	Wireless Application Protocol

2. PERFORMANCE

2.1 Product Name

LG-E730 : WCDMA2100/900+EGSM/GSM850/DCS/PCS

(HSDPA 7.2Mbps / HSUPA 2.9Mbps / GPRS Class 12 / EDGE Class 12)

2.2 Supporting Standard

Item	Feature	Comment
Supporting Standard	WCDMA(FDD1,8)/EGSM/GSM850/DCS1800/PCS1900 with seamless handover Phase 2+(include AMR)	
Frequency Range	WCDMA(FDD1) TX : 1920 - 1980 MHz WCDMA(FDD1) RX : 2110 - 2170 MHz WCDMA(FDD8) TX : 880 - 915 MHz WCDMA(FDD8) RX : 925 – 960 MHz EGSM TX : 880 – 915 MHz EGSM RX : 925 – 960 MHz GSM850 TX : 824 – 849 MHz GSM850 RX : 869 – 894 MHz DCS1800 TX : 1710 – 1785 MHz DCS1800 RX : 1805 – 1880 MHz PCS1900 TX : 1850 – 1910 MHz PCS1900 RX : 1930 – 1990 MHz	
Application Standard	Android OS	

2.3 Main Parts : GSM Solution

Item	Part Name	Comment
Digital Baseband	MSM8255 : Qualcomm	
Analog Baseband	PM8058 : Qualcomm	
RF Chip	QTR8200 : Qualcomm	

2.4 HW Features

Item		Feature	Comment
Form Factor		BAR type	
Battery		1) Capacity Standard : Li-ion, 1500mAh	
		2) Packing Type : Soft Pack	
Size		Standard : 122.5 x 62.5 x 9.7mm	
Weight		107g	With Battery
Stand by time		2G Up to 400 hrs 3G Up to 375 hrs	@ Paging Period 5 (2G) @ DRX 7 (3G)
Charging time		Within 3 hrs 30min	@ Power Off
Talk time		2G Up to 5 hrs 3G Up to 6 hrs	@ Power Level 5 (2G) @ Tx = 12dBm (3G)
RX sensitivity		WCDMA(FDD1) : -106.7 dBm WCDMA(FDD8) : -106.7 dBm EGSM : -105 dBm GSM850 : -105 dBm DCS 1800 : -105 dBm PCS 1900 : -105 dBm	
TX output power	WCDMA/ GSM/ GPRS	WCDMA : 24dBm/3.84MHz,+1/-3dBm EGSM : 33dBm GSM850 : 33 dBm DCS1800 : 30 dBm PCS 1900: 30 dBm	Class3(WCDMA) Class4 (EGSM) Class4 (GSM850) Class1 (PCS) Class1 (DCS)
	EDGE	GSM 850 : 27 dBm GSM 900 : 27 dBm DCS 1800 : 26 dBm PCS 1900 : 26 dBm	E2 (GSM850) E2 (GSM900) E2 (PCS) E2 (DCS)
GPRS compatibility		GPRS Class 12	
EDGE compatibility		EDGE Class 12	
SIM card type		Plug-In SIM 3.3V /1.8V	

Display	Main LCD - AMOLED (3.8 inch , 800 x 480)	
Built-in Camera	5M CMOS Camera VGA secondary camera	
Status Indicator	No	
Keypad	Touch Screen Touch Key : 3 Side Key : 3	Side Key : Power On Volume up/down
ANT	Main : Internal Fixed Type	
System connector	5 Pin u-USB	
Ear Phone Jack	3.5 pi type	
PC synchronization	Yes	
Memory	eMMC: 2Gbyte SDRAM: 4Gbit	
Speech coding	FR, EFR, HR,AMR	
Vibrator	Built in Vibrator	
Blue Tooth	Bluetooth 3.0+HS	
MIDI(for Buzzer Function)	SW Decoded 72Poly	
Music Player	MP3/WMA/AAC/MIDI/EAAC+/HE AAC/OGG	
Video Player	MPEG4, H.264	
Camcorder	MPEG4 or H.263	
Voice Recording	Yes	
Speaker Phone mode Support	Yes	
Travel Adapter	Yes	
CDROM	No	
Stereo Headset	Yes	
Data Cable	Yes	
T-Flash (External Memory)	Yes	2GB included (up to 32GB supported)

2.5 SW Features

Item	Feature	Comment
RSSI	0 ~ 4 Levels	
Battery Charging	0 ~ 6 Levels	
Key Volume	0 ~ 7 Level	
Audio Volume	1 ~ 15 Level	
Time / Date Display	Yes	
Multi-Language	Yes	CZECH , DUTCH , FRENCH , GERMAN , GREEK , ITALIAN , PORTUGUESE , SPANISH , ARABIC , HEBREW , T CHINESE TW , S CHINESE , ROMANIAN , HUNGARIAN , SLOVAK , CROATIAN , BULGARIAN , MACEDONIAN , ICELANDIC
Quick Access Mode	Phone / Contacts / Messaging / Menu	
PC Sync	Yes	
Speed Dial	Yes	Voice mail center -> 1 key
Profile	Yes	not same with feature phone setting
CLIP / CLIR	Yes	
Phone Book	Name / Number / Email / Chat Id / Website / Postal addresses / Organizations / Groups / BirthdayNotes / Ringtone	There is no limitation on the number of items. It depends on available memory amount.
Last Dial Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Last Received Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Last Missed Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Search by Number / Name	Name / N	
Group	Yes	There is no limitation on the number of items. It depends on available memory amount.
Fixed Dial Number	Yes	
Service Dial Number	No	

Own Number	Yes	Read only (add/edit/delete are not supported)
Voice Memo	Yes	Support voice recorder
Call Reminder	Yes	Missed call popup
Network Selection	Automatic	
Mute	Yes	
Call Divert	Yes	
Call Barring	Yes	
Call Charge (AoC)	Yes	
Call Duration	Yes	
SMS (EMS)	There is no limitation on the number of items. It depends on available memory amount.	EMS does not support.
SMS Over GPRS	No	
EMS Melody / Picture Send / Receive / Save	No No	
MMS MPEG4 Send / Receive / Save	Yes Yes	
Long Message	MAX 459 characters	SMS 3pages
Cell Broadcast	Yes	
Download	Over the Web	
Game	Yes	
Calendar	Yes	
Memo	Yes	There is no limitation on the number of items. It depends on available memory amount.
World Clock	Yes	
Unit Convert	No	
Stop Watch	Yes	
Wall Paper	Yes	
WAP Browser	No	Support only web browser based on webkit. WAP stack and wml are not supported.
Download Melody / Wallpaper	Yes	Over web browser

SIM Lock	Yes	Operator Dependent
SIM Toolkit	Class 1, 2, 3, C, D	
MMS	Yes	
EONS	Yes	
CPHS	Yes	V4.2
ENS	No	
Camera	Yes	5M AF / Digital Zoom : x3
JAVA	No	Android do not support JAVA
Voice Dial	No	
IrDa	No	
Bluetooth	Yes	Ver. 3.0 (GAP, A2DP, AVRCP) DUN, FTP, GAVDP, GOEP, HFP, HSP, OPP, SDAP, SPP)
FM radio	Yes	
GPRS	Yes	Class 12
EDGE	Yes	Class 12
Hold / Retrieve	Yes	
Conference Call	Yes	Max. 6
DTMF	Yes	
Memo pad	No	
TTY	No	
AMR	Yes	
SyncML	Yes	
IM	Yes	Gtalk
Email	Yes	

2.6 HW SPEC.

1) GSM transceiver specification

Item	Specification
Phase Error	Rms : 5° Peak : 20 °
Frequency Error	GSM : 0.1 ppm DCS/PCS : 0.1 ppm
EMC(Radiated Spurious Emission Disturbance)	GSM/DCS : < -28dBm
Transmitter Output power and Burst Timing	GSM : 5dBm – 33dBm ± 3dB DCS/PCS : 0dBm – 30dBm ± 3dB
Burst Timing	<3.69us
Spectrum due to modulation out to less than 1800kHz offset	200kHz : -36dBm 600kHz : -51dBm/-56dBm
Spectrum due to modulation out to larger than 1800kHz offset to the edge of the transmit band	GSM : 1800-3000kHz :< -63dBc(-46dBm) 3000kHz-6000kHz : <-65dBc(-46dBm) 6000kHz < : < -71dBc(-46dBm) DCS : 1800-3000kHz :< -65dBc(-51dBm) 6000kHz < : < -73dBc(-51dBm)
Spectrum due to switching transient	400kHz : -19dBm/-22dBm(5/0), -23dBm 600kHz : -21dBm/-24dBm(5/0), -26dBm
Reference Sensitivity – TCH/FS	Class II(RBER) : -105dBm(2.439%)
Usable receiver input level range	0.012(-15 - -40dBm)
Intermodulation rejection – Speech channels	± 800kHz, ± 1600kHz : -98dBm/-96dBm (2.439%)
AM Suppression – GSM : -31dBm - DCS : -29dBm	-98dBm/-96dBm (2.439%)
Timing Advance	± 0.5T

2) WCDMA transmitter specification

Item	Specification
Transmit Frequency	BD1: 1920MHz ~ 1980 MHz BD8: 880 MHz ~ 915 MHz
Maximum Output Power	+24 dBm / 3.84 MHz, +1 / -3 dB
Frequency Error	within ±0.1 PPM
Open Loop Power Control	Normal Conditions : within ±9 dB, Extreme Conditions : within ±12 dB
Minimum Transmit Power	< -50 dBm /3.84 MHz
Occupied Bandwidth	< 5 MHz at 3.84 Mcps (99% of power)
Adjacent Channel Leakage Power Ratio (ACLR)	> 33 dB @ ±5 MHz, > 43 dB @ ±10 MHz
Spurious Emissions |f-fc| > 12.5 MHz	< -36 dBm / 1 kHz RW @ 9 kHz ≤ f < 150 kHz < -36 dBm / 10 kHz RW @ 150 KHz ≤ f < 30 MHz < -36 dBm / 100 kHz RW @ 30 MHz ≤ f < 1 GHz < -30 dBm / 1 MHz RW @ 1 GHz ≤ f < 12.75 GHz < -60 dBm / 3.84 MHz RW @ 869 MHz ≤ f ≤ 894 MHz < -60 dBm / 3.84 MHz RW @ 1930 MHz ≤ f ≤ 1900 MHz < -60 dBm / 3.84 MHz RW @ 2110 MHz ≤ f ≤ 2155 MHz < -67 dBm / 100 kHz RW @ 925 MHz ≤ f ≤ 935 MHz < -79 dBm / 100 kHz RW @ 935 MHz < f ≤ 960 GHz < -71 dBm / 100 kHz RW @ 1805 MHz ≤ f ≤ 1880 MHz < -41 dBm / 300 kHz RW @ 1884.5 MHz < f < 1919.6 MHz
Transmit Intermodulation	< -31 dBc @ 5 MHz & < -41 dBc @ 10 MHz when Interference CW Signal Level = -40 dBc
Error Vector Magnitude	< 17.5 %, when Pout ≥ -20 dBm
Peak Code Domain Error	< -15 dB at Pout ≥ -20 dBm

3) WCDMA receiver specification

Item	Specification
Receive Frequency	BD1: 2110 MHz ~2170 MHz BD8: 925 MHz ~ 960 MHz
Reference Sensitivity Level	Band1 : BER < 0.001 when Îor = -106.7 dBm / 3.84 MHz Band8 : BER < 0.001 when Îor = -106.7 dBm / 3.84 MHz
Maximum Input Level	BER < 0.001 when Îor = -25 dBm / 3.84 MHz
Adjacent Channel Selectivity (ACS)	ACS > 33 dB where BER < 0.001 when Îor = -92.7 dBm / 3.84 MHz & Ioac = –52 dBm / 3.84 MHz @ ±5 MHz
Blocking Characteristic	BER < 0.001 when Îor = -103.7 dBm / 3.84 MHz & Iblocking = -56 dBm / 3.84 MHz @ Fuw(offset) = ±10 MHz or Iblocking = -44 dBm / 3.84 MHz @ Fuw(offset) = ±15 MHz
Spurious Response	BER < 0.001 when Îor = -103.7 dBm / 3.84 MHz & Iblocking = -44 dBm
Intermodulation	BER < 0.001 when Îor= -103.7 dBm / 3.84 MHz & Iouw1 = -46 dBm @ Fuw1(offset) = ±10 MHz & Iouw2 = -46 dBm / 3.84 MHz @ Fuw2(offset) = ±20 MHz
Spurious Emissions	< -57 dBm / 100 kHz BW @ 9 kHz ≤ f < 1 GHz < -47 dBm / 1 MHz BW @ 1 GHz ≤ f ≤ 12.75 GHz
Inner Loop Power Control In Uplink	Adjust output(TPC command) cmd 1dB 2dB 3dB +1 +0.5/1.5 +1/3 +1.5/4 0 -0.5/+0.5 -0.5/+0.5 -0.5/+0.5 -1 -0.5/-1.5 -1/-3 -1.5/-4 group(10equal command group) +1 +8/+12 +16/+24

4) HSDPA transmitter specification

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Transmit Frequency</td><td>BD1: 1920MHz ~ 1980 MHz
BD8: 880 MHz ~ 915 MHz</td></tr>
<tr><td>Maximum Output Power</td><td>Sub-Test
1=1/15, 2=12/15 21~25dBm / 3.84 MHz
3=13/15 4=15/8 20~25dBm / 3.84 MHz
5=15/7 6=15/0 19~25dBm / 3.84 MHz</td></tr>
<tr><td>HS-DPCCH</td><td>
<table>
<tr><th>Sub-test in table C.10.1.4</th><th>Power step</th><th>Power step slot boundary</th><th>Power step size, P [dB]</th><th>Transmitter power step tolerance [dB]</th></tr>
<tr><td rowspan="4">5</td><td>1</td><td>Start of Ack/Nack</td><td>6</td><td>+/- 2.3</td></tr>
<tr><td>2</td><td>Start of CQI</td><td>1</td><td>+/- 0.6</td></tr>
<tr><td>3</td><td>Middle of CQI</td><td>0</td><td>+/- 0.6</td></tr>
<tr><td>4</td><td>End of CQI</td><td>5</td><td>+/- 2.3</td></tr>
</table>
</td></tr>
<tr><td>Spectrum Emission Mask</td><td>Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0
<table>
<tr><th>Frequency offset from carrier △f</th><th>Minimum requirement</th><th>Measurement Bandwidth</th></tr>
<tr><td>2.5 ~ 3.5 MHz</td><td>-35-15×(△f-2.5)dBc</td><td>30 kHz</td></tr>
<tr><td>3.5 ~ 7.5 MHz</td><td>-35-1×(△f-3.5)dBc</td><td>1 MHz</td></tr>
<tr><td>7.5 ~ 8.5 MHz</td><td>-35-10×(△f-7.5)dBc</td><td>1 MHz</td></tr>
<tr><td>8.5 ~ 12.5 MHz</td><td>-49dBc</td><td>1 MHz</td></tr>
</table>
</td></tr>
<tr><td>Adjacent Channel Leakage Power Ratio (ACLR)</td><td>Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0
> 33 dB @ ±5 MHz
> 43 dB @ ±10 MHz</td></tr>
<tr><td>Error Vector Magnitude</td><td>< 17.5 %, when Pout ≥ -20 dBm</td></tr>
</table>

5) HSDPA receiver specification

Item	Specification
Receive Frequency	BD1: 2110 MHz ~2170 MHz BD8: 925 MHz ~ 960 MHz
Maximum Input Level (BLER or R), 16QAM Only	Sub-Test : 1=1/15, 2=12/15, 3=13/15, 4=15/8, 5=15/7, 6=15/0 BLER < 10% or R >= 700kbps

6) HSUPA Tx, Rx specification

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Maximum Output Power</td><td>Sub-Test
1=11/15 21~24dBm / 3.84 MHz
2=6/15 19~22dBm / 3.84 MHz
3=15/9 20~23dBm / 3.84 MHz
4=2/15 20~25dBm / 3.84 MHz
5=15/15 19~25dBm / 3.84 MHz</td></tr>
<tr><td>Spectrum Emission Mask</td><td>Sub-Test : 1=11/15, 2=6/15, 3=15/9, 4=2/15, 5=15/15
<table>
<tr><td>Frequency offset from carrier △f</td><td>Minimum requirement</td><td>Measurement Bandwidth</td></tr>
<tr><td>2.5 ~ 3.5 MHz</td><td>-35-15×(△f-2.5)dBc</td><td>30 kHz</td></tr>
<tr><td>3.5 ~ 7.5 MHz</td><td>-35-1×(△f-3.5)dBc</td><td>1 MHz</td></tr>
<tr><td>7.5 ~ 8.5 MHz</td><td>-35-10×(△f-7.5)dBc</td><td>1 MHz</td></tr>
<tr><td>8.5 ~ 12.5 MHz</td><td>-49dBc</td><td>1 MHz</td></tr>
</table></td></tr>
<tr><td>Adjacent Channel Leakage Power Ratio (ACLR)</td><td>Sub-Test : 1=11/15, 2=6/15, 3=15/9, 4=2/15, 5=15/15
> 33 dB @ ±5 MHz
> 43 dB @ ±10 MHz</td></tr>
</table>

7) WLAN 802.11b transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -30 @ fc-22MHz< f <fc-11MHz and fc+11MHz< f <fc+22MHz ≤ -50 @ f < fc-22MHz and f > fc+22MHz
Power ramp on/off time	≤ 2us
Carrier Suppression	≤ -15dB
Modulation Accuracy (Peak EVM)	≤ 35%
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	≤ -76dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Max input Sensitivity	≥ -10dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Adjacent Channel Rejection	≥ 35dB @FER ≤ 8%, interference input signal -70dBm@fc±25MHz(11Mbps)

8) WLAN 802.11g transceiver specification

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Transmit Frequency</td><td>2400 MHz ~ 2483.5 MHz (CH1~CH13)</td></tr>
<tr><td>Tx Power Level</td><td>≤ 20dBm</td></tr>
<tr><td>Frequency Tolerance</td><td>within ±25 PPM</td></tr>
<tr><td>Chip clock Frequency Tolerance</td><td>within ±25 PPM</td></tr>
<tr><td>Spectrum Mask</td><td>≤ -22 dBc @ ±11MHz offset (9Mhz ~ 11MHz)
≤ -30 dBc @ ±20MHz offset (11MHz ~ 20Mhz)
≤ -42 dBc @ ±30MHz offset (20MHz ~ 30Mhz)</td></tr>
<tr><td>Transmitter constellation error (rms EVM)</td><td>
<table>
<tr><td>6Mbps</td><td>Spec.: ≤ -5dB (56.23%)</td></tr>
<tr><td>9Mbps</td><td>Spec.: ≤ -8dB (39.81%)</td></tr>
<tr><td>12Mbps</td><td>Spec.: ≤ -10dB (31.62%)</td></tr>
<tr><td>18Mbps</td><td>Spec.: ≤ -13dB (22.39%)</td></tr>
<tr><td>24Mbps</td><td>Spec.: ≤ -16dB (15.85%)</td></tr>
<tr><td>36Mbps</td><td>Spec.: ≤ -19dB (11.22%)</td></tr>
<tr><td>48Mbps</td><td>Spec.: ≤ -22dB (7.94%)</td></tr>
<tr><td>54Mbps</td><td>Spec.: ≤ -25dB (5.6%)</td></tr>
</table>
</td></tr>
<tr><td>Spurious Emissions</td><td>< -36 dBm @ 30MHz ~ 1GHz
< -30 dBm above @ 1GHz ~ 12.75GHz
< -47 dBm @ 1.8GHz ~ 1.9GHz
< -47 dBm @ 5.15GHz ~ 5.3GHz</td></tr>
<tr><td>Rx Min input Sensitivity</td><td>PER ≤ 10%
<table>
<tr><td>6Mbps</td><td>Spec.:-82dBm</td></tr>
<tr><td>9Mbps</td><td>Spec.:-81dBm</td></tr>
<tr><td>12Mbps</td><td>Spec.:-79dBm</td></tr>
<tr><td>18Mbps</td><td>Spec.:-77dBm</td></tr>
<tr><td>24Mbps</td><td>Spec.:-74dBm</td></tr>
<tr><td>36Mbps</td><td>Spec.:-70dBm</td></tr>
<tr><td>48Mbps</td><td>Spec.:-66dBm</td></tr>
<tr><td>54Mbps</td><td>Spec.:-65dBm</td></tr>
</table>
</td></tr>
<tr><td>Rx Max input Sensitivity</td><td>≥ -20dBm@ PER ≤ 10%</td></tr>
<tr><td>Rx Adjacent Channel Rejection</td><td>PER ≤ 10%,
-1dB(54Mbps)</td></tr>
</table>

9) WLAN 802.11n transceiver specification

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Transmit Frequency</td><td>2400 MHz ~ 2483.5 MHz (CH1~CH13)</td></tr>
<tr><td>Tx Power Level</td><td>≤ 20dBm</td></tr>
<tr><td>Frequency Tolerance</td><td>within ±25 PPM</td></tr>
<tr><td>Chip clock Frequency Tolerance</td><td>within ±25 PPM</td></tr>
<tr><td>Spectrum Mask</td><td>≤ -20 dBc @ ±11MHz offset (9Mhz ~ 11MHz)
≤ -28 dBc @ ±20MHz offset (11MHz ~ 20Mhz)
≤ -45 dBc @ ±30MHz offset (20MHz ~ 30Mhz)</td></tr>
<tr><td>Transmitter constellation error
(rms EVM)</td><td>
<table>
<tr><td>6.5Mbps</td><td>Spec.: ≤ -5dB (56.23%)</td></tr>
<tr><td>13Mbps</td><td>Spec.: ≤ -10dB (31.62%)</td></tr>
<tr><td>19.5Mbps</td><td>Spec.: ≤ -13dB (22.39%)</td></tr>
<tr><td>26Mbps</td><td>Spec.: ≤ -16dB (15.85%)</td></tr>
<tr><td>39Mbps</td><td>Spec.: ≤ -19dB (11.22%)</td></tr>
<tr><td>52Mbps</td><td>Spec.: ≤ -22dB (7.94%)</td></tr>
<tr><td>58.5Mbps</td><td>Spec.: ≤ -25dB (5.6%)</td></tr>
<tr><td>65Mbps</td><td>Spec.: ≤ -28dB (3.98%)</td></tr>
</table>
</td></tr>
<tr><td>Spurious Emissions</td><td>< -36 dBm @ 30MHz ~ 1GHz
< -30 dBm above @ 1GHz ~ 12.75GHz
< -47 dBm @ 1.8GHz ~ 1.9GHz
< -47 dBm @ 5.15GHz ~ 5.3GHz</td></tr>
<tr><td>Rx Min input Sensitivity</td><td>PER ≤ 10%
<table>
<tr><td>6.5Mbps</td><td>Spec.:-82dBm</td></tr>
<tr><td>13Mbps</td><td>Spec.:-79dBm</td></tr>
<tr><td>19.5Mbps</td><td>Spec.:-77dBm</td></tr>
<tr><td>26Mbps</td><td>Spec.:-74dBm</td></tr>
<tr><td>39Mbps</td><td>Spec.:-70dBm</td></tr>
<tr><td>52Mbps</td><td>Spec.:-66dBm</td></tr>
<tr><td>58.6Mbps</td><td>Spec.:-65dBm</td></tr>
<tr><td>65Mbps</td><td>Spec.:-64dBm</td></tr>
</table>
</td></tr>
<tr><td>Rx Max input Sensitivity</td><td>≥ -20dBm @ PER ≤ 10%</td></tr>
<tr><td>Rx Adjacent Channel
Rejection</td><td>PER ≤ 10%,
-2dB (65Mbps)</td></tr>
</table>

10) GPS receiver specification

Item	Specification
Receive Frequency	GPS (1574.42 MHz ~ 1576.42 MHz) *GLONASS (1597.55 MHz ~ 1605.89 MHz)
Minimum Sensitivity	GPS (1 satellite ≥-142dBm, 7 satellites ≥ -147dBm at coarse time aiding)

11) Current consumption

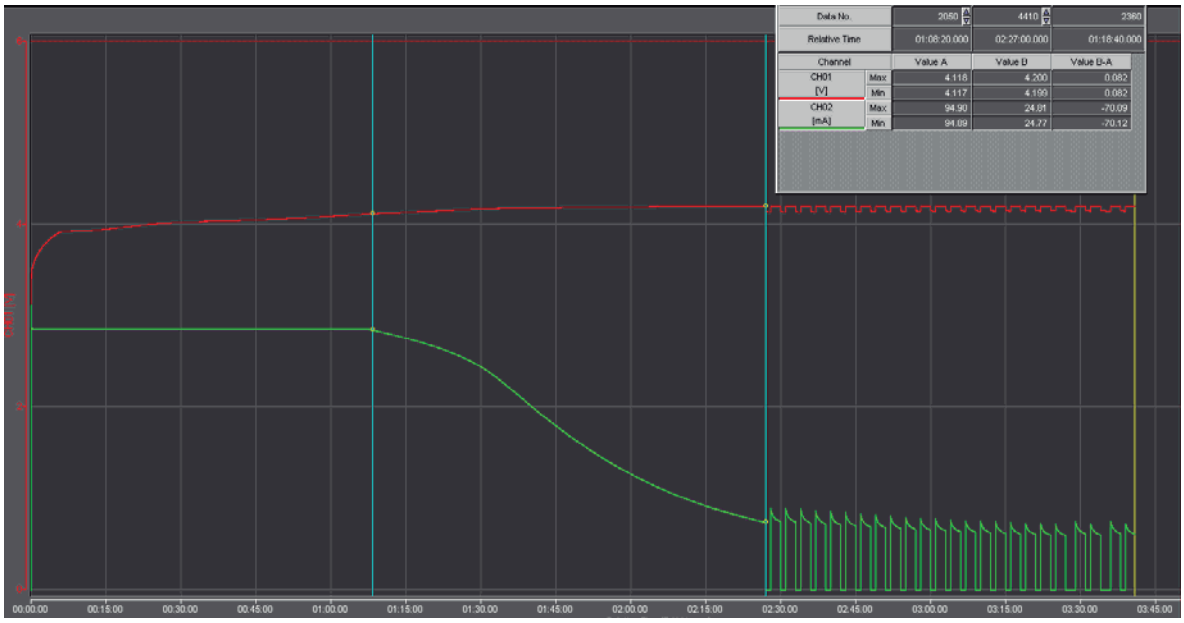
	Stand by		Voice Call	VT
	Bluetooth Off	Bluetooth Connected		
WCDMA Only	4.0 mA under (DRX=1.28)	7 mA under (DRX=1.28)	270 mA under (Tx=12dBm)	WCDMA Only
GSM Only	4.0 mA under (Paging=5 period)	7 mA under (Paging=5 period)	340 mA under (Tx=Max)	GSM Only

12) Battery life time

	Stand by	Voice Call	VT
WCDMA	375 hours over (DRX = 1.28)	360 min over (TX = 12dBm, Low Pwr mode)	
GSM	400 hours over (Paging Period = 9)	300 min over (TX Level = Max)	

13) Charging hour

3.5hour under (1500mAh battery, 700mA TA)



14) RSSI indicator (Based on Cell power)

BAR	WCDMA	GSM/DCS/PCS
4	Over -88±2dBm	Over -91 ±2dBm
4◊3	-88 ±2dBm	-91 ±2dBm
3◊2	-96 ±2dBm	-99 ±2dBm
2◊1	-104 ±2dBm	-103 ±2dBm
1◊0	-110 ±2dBm	-105 ±2dBm

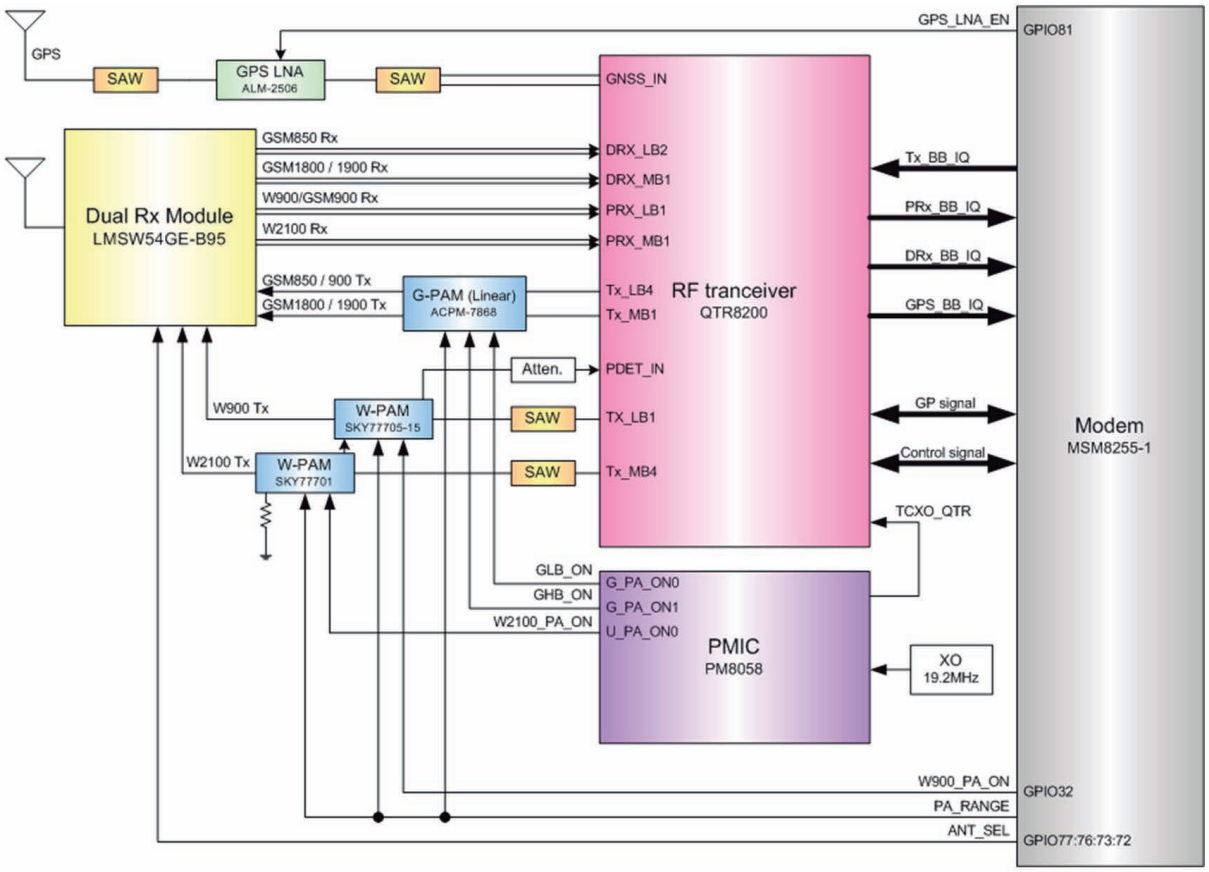
15) Battery indicator

Battery Bar	Specification	
BAR 6 (Full)	90% over	remain%
BAR 6 --> 5	90% ◊ 89%	
BAR 5 --> 4	70% ◊ 69%	
BAR 4 --> 3	50% ◊ 49%	
BAR 3 --> 2	30% ◊ 29%	
BAR 2 --> 1	15% ◊ 14%	
BAR 1 --> 0	5% ◊ 4%	
Low Battery Pop-up	4% ~ 15% : One Time popup (No call)	
Critical Low Battery Pop-up	0% ~ 3% : Every Level change popup (No call)	
POWER OFF	0%	

3. TECHNICAL BRIEF

3.1 GENERAL DESCRIPTION

The LG-E730 supports UMTS-2100, UMTS-900, GSM-850, GSM-900, GSM-1800, and GSM-1900 based GSM/GPRS/EDGE/UMTS. All receivers and the UMTS transmitter use the radioOne1Zero-IF architecture to eliminate intermediate frequencies, directly converting signals between RF and baseband. The quad-band GSM transmitters use a baseband-to-IF upconversion followed by an offset phase-locked loop that translates the GMSK-modulated or 8-PSK-modulated signal to RF.



[Figure 3.1] Block diagram of RF part

A generic, high-level functional block diagram of E730 shown in Figure 3.1. One antenna collects base station forward link signals and radiates handset reverse link signals. The antenna connects with receive and transmit paths through a ASM(Antenna-Switch-Module).

The UMTS receive paths each include an LNA, an RF band-pass filter, and a downconverter that translate the signal directly from RF-to-baseband using radioOne ZIF techniques. The RFIC's Rx analog baseband outputs, for the receive chains, connect to the MSM IC. The UMTS and GSM Rx baseband outputs share the same inputs to the MSM IC.

For the transmit chains, the QTR8200/8600 IC directly translates the Tx baseband signals (from the MSM device) to an RF signal using an internal LO generated by integrated onchip PLL and VCO. The QTR8200/8600 IC outputs deliver fairly high-level RF signals that are first filtered by Tx S900 and then amplified by their respective UMTS PAs. In the GSM receive path, the received RF signals are applied through their band-pass filters and down-converted directly to baseband in the QTR8200/8600 transceiver IC. These baseband outputs are shared with the UMTS receiver and routed to the MSM IC for further signal processing.

The GSM/EDGE transmit path employs one stage of up-conversion and, in order to improve efficiency, is divided into phase and amplitude components to produce an open-loop Polar topology:

The on-chip quadrature up-converter translates the GMSK-modulated signal or 8-PSK modulated signal, to a constant envelope phase signal at RF.

The amplitude-modulated (AM) component is applied to the ramping control pin of Polar power amplifier from a DAC within the MSM LG-E730 power supply voltages are managed and regulated by the PM8058 Power Management IC. This versatile device integrates all wireless handset power management, general housekeeping, and user interface support functions into a single mixed signal IC.

It monitors and controls the external power source and coordinates battery recharging while maintaining the handset supply voltages using low dropout, programmable regulators.

The device's general housekeeping functions include an ADC and analog multiplexer circuit for monitoring on-chip voltage sources, charging status, and current flow, as well as user-defined off-chip variables such as temperature, RF output power, and battery ID.

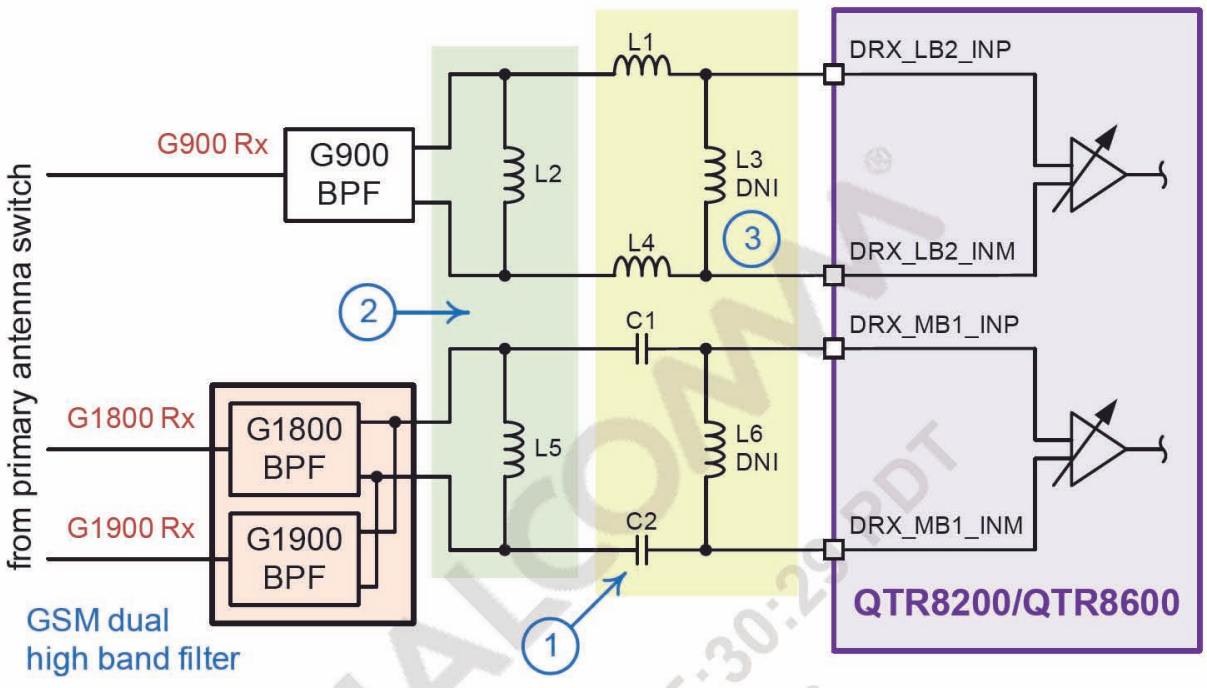
Various oscillator, clock, and counter circuits support IC and higher-level handset functions. Key parameters such as under-voltage lockout and crystal oscillator signal presence are monitored to protect against detrimental conditions.

3.2 GSM mode

3.2.1GSM RECEIVER

The GSM-850, GSM-900, GSM-1800, and GSM-1900 receiver inputs of QTR8200/8600 are connected directly to the transceiver front-end Module. Since the GSM-850 band covers the same frequency range as the CDMA cellular band and the UMTS-850 band. Sharing the GSM front-end with a CDMA or UMTS path is called co-banding.

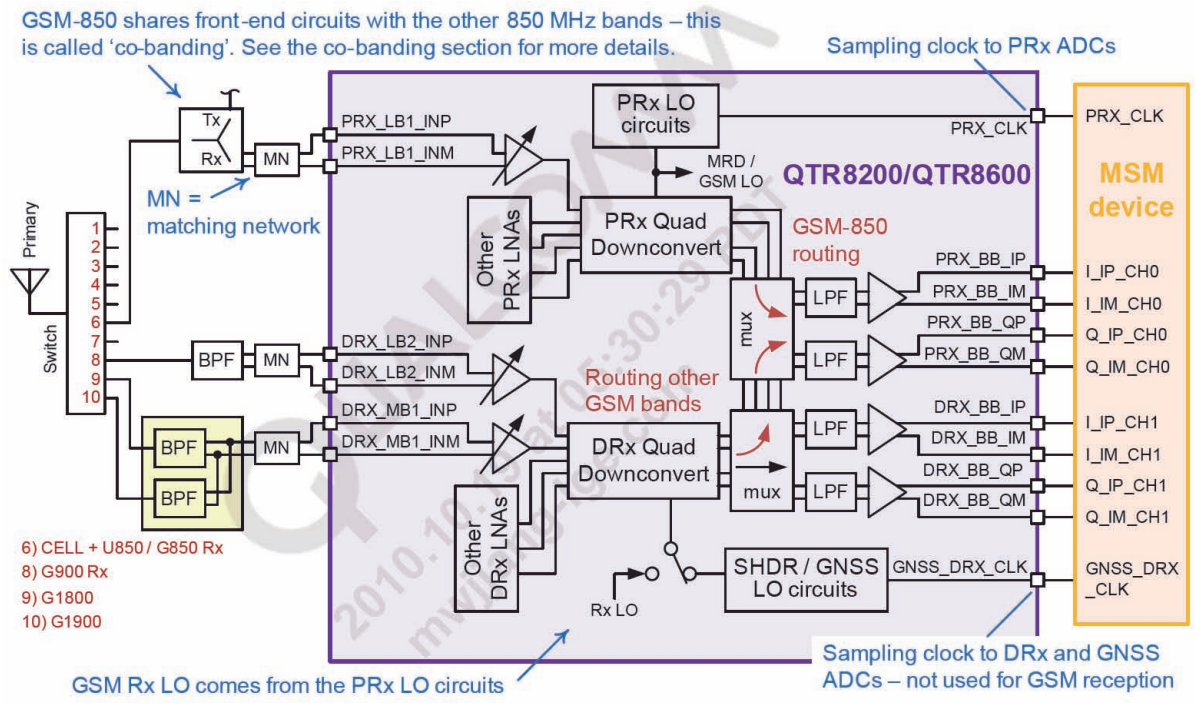
GSM-850, GSM-900, GSM-1800, and GSM-1900 receiver inputs use differential configurations to improve common-mode rejection and second-order non-linearity performance. For example Figure 3.2.1 shows receiver input topologies for GSM850 and GSM900 (DCS/PCS have the same receiver input topologies). The balance between the complementary signals is critical and must be maintained from the RF filter outputs all the way into the IC pins.



[Figure 3.2.1] GSM900, DCS/PCS Receiver Inputs Topologies

Since GSM-850, GSM-900, GSM-1800, and GSM-1900 signals are time-division duplex (the handset can only receive or transmit at one time), switches are used to separate Rx and Tx signals in place of frequency duplexers – this is accomplished in the switch module. The GSM-850, GSM-900, GSM-1800, and GSM-1900 receive signals are routed to the QTR8200/8600 through band selection filters and matching networks that transform single-ended 50-ohm sources to differential impedances optimized for gain and noise figure. The QTR input uses a differential configuration to improve second-order intermodulation and common mode rejection performance. The QTR8200/8600 input stages include MSM-controlled gain adjustments that maximize receiver dynamic range.

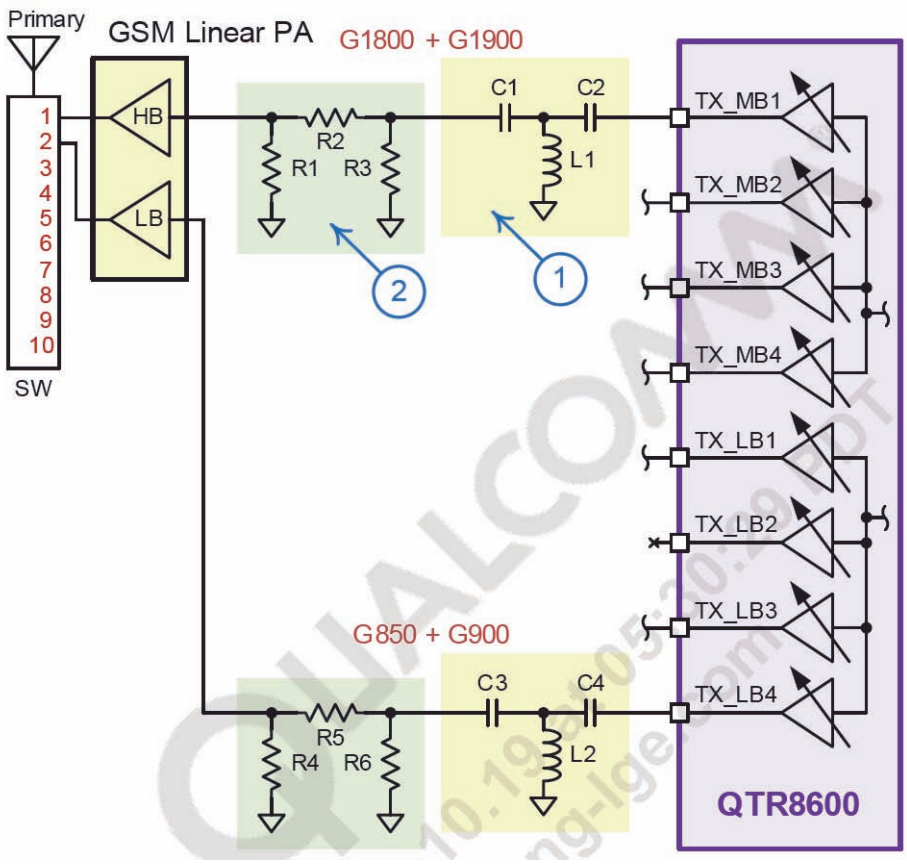
The amplifier outputs drive the RF ports of the quadrature RF-to-baseband downconverters.
The downconverted baseband outputs are multiplexed and routed to lowpass filters (one I and one Q) having pass band and stop band characteristics suitable for GMSK or 8-PSK processing. These filter circuits include DC offset corrections. The filter outputs are buffered and passed on to the MSM8255 IC for further processing as shown in Figure 3.2.3.



[Figure 3.2.3] GSM receivers and example application

3.2.1 GSM TRANSMITTER

The QTR8200/8600 transmitter outputs (TX_MB1 and TX_LB4) include on-chip output matching inductors. 50ohm output impedance is achieved by adding a series capacitor at the output pins. The capacitor value may be optimized for specific applications and PCB characteristics based on pass-band symmetry about the band center frequency as shown in Figure 3.2.4.



[Figure 3.2.4] GSM Transmitter Outputs Topologies

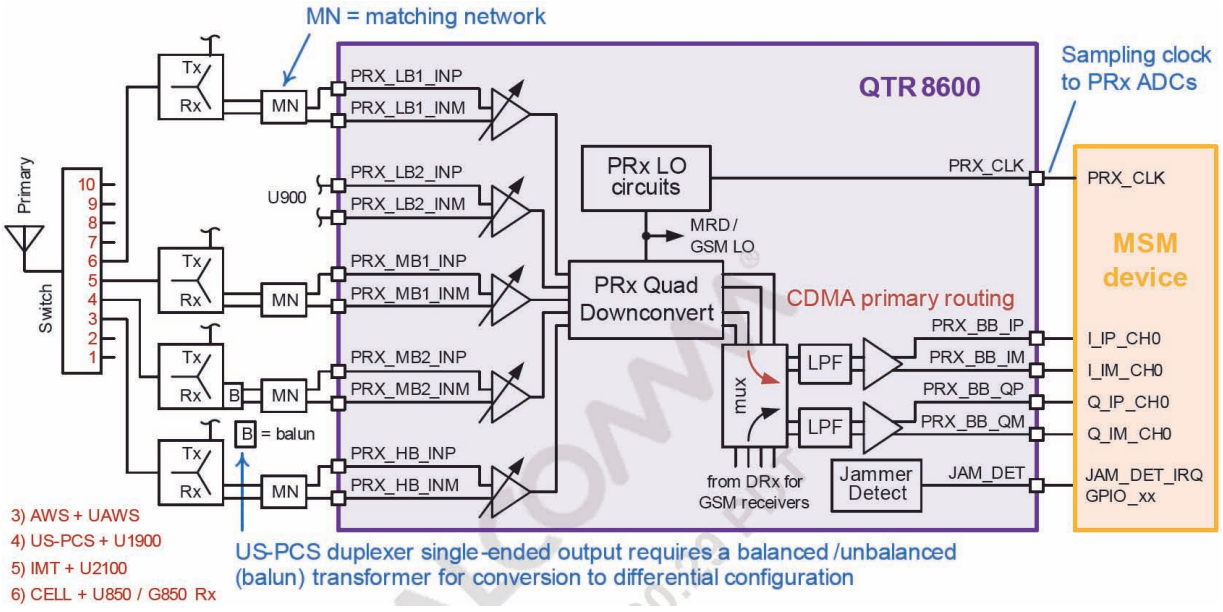
The QTR8200/8600 IC is able to support GSM 850/900 and GSM 1800/1900 mode transmitting. This design guideline shows a tri-band GSM application. Both high-band and low band outputs are followed by resistive pads to ensure that the load presented to the outputs remains close to 50ohm.

3.3 UMTS mode

3.3.1UMTS RECEIVER

The UMTS duplexer receiver output is routed to LNA circuits within the QTR8200/8600 device as shown in Figure 3.5. The UMTS Rx input is provided with an on-chip LNA that amplifies the signal before a second stage filter that provides differential downconverter as shown in Figure 3.3.1. This second stage input is configured differentially to optimize secondorder intermodulation and common mode rejection performance. The gain of the UMTS frontend amplifier and the UMTS second stage differential amplifier are adjustable, under MSM control, to extend the dynamic range of the receivers. The second stage UMTS Rx amplifiers drive the RF ports of the quadrature RF-to-baseband downconverters. The downconverted UMTS Rx baseband outputs are routed to lowpass filters having passband and stopband characteristics suitable for UMTS Rx processing.

These filter circuits allow DC offset corrections, and their differential outputs are buffered to interface shared with GSM Rx to the MSM IC. The UMTS baseband outputs are turned off when the QTR8200/8600 is downconverting GSM signals and on when the UMTS is operating.



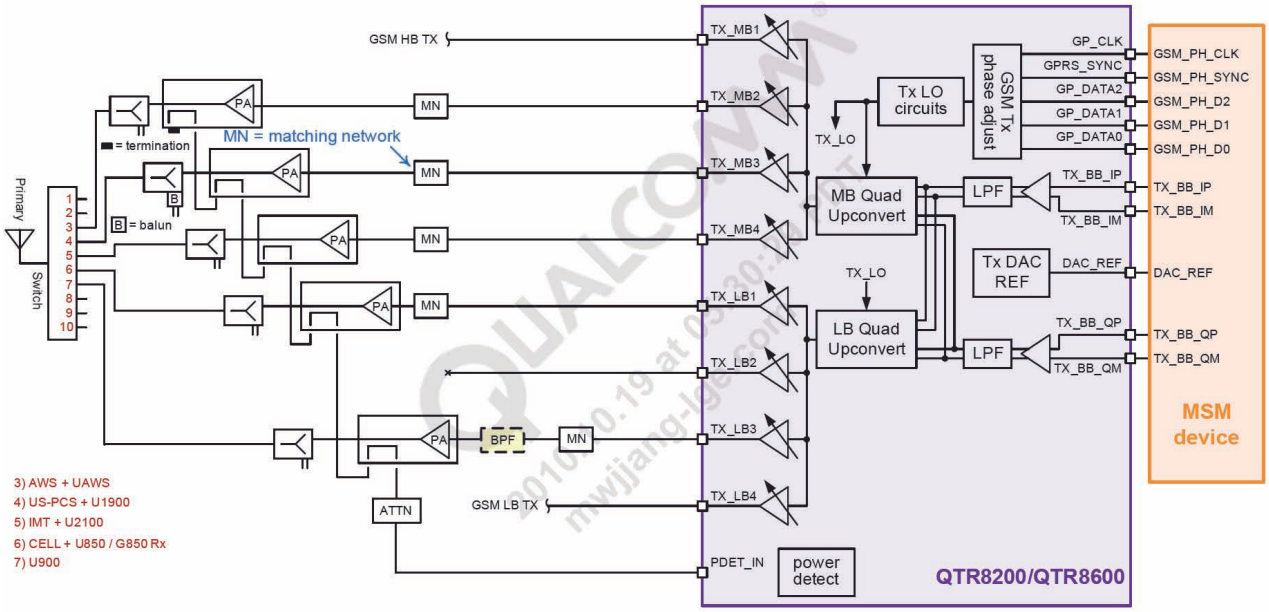
[Figure 3.3.1] UMTS Receiver Inputs Topologies

3.3.2 UMTS TRANSMITTER

The UMTS Tx path begins with differential baseband signals (I and Q) from the MSM device. These analog input signals are amplified, filtered, and applied to the quadrature up-converter mixers. The up-converter output is amplified by multiple variable gain stages that provide transmit AGC control. The AGC output is filtered and applied to the driver amplifier; this output stage includes an integrated matching inductor that simplifies the external matching network to a single series capacitor to achieve the desired 50-ohm interface.

The QTR8200/8600 UMTS output is routed to its power amplifier through a bandpass filter, and delivers fairly high-level signals that are filtered and applied to the PA. Transmit power is delivered from the duplexer to the antenna through the switch module. The transceiver LO synthesizer is contained within the QTR8200/8600 IC with the exception of the off-chip loop filter components and the VC-TCXO. This provides a simplified design for multimode applications. The PLL circuits include a reference divider, phase detector, charge pump, feedback divider, and digital logic generator.

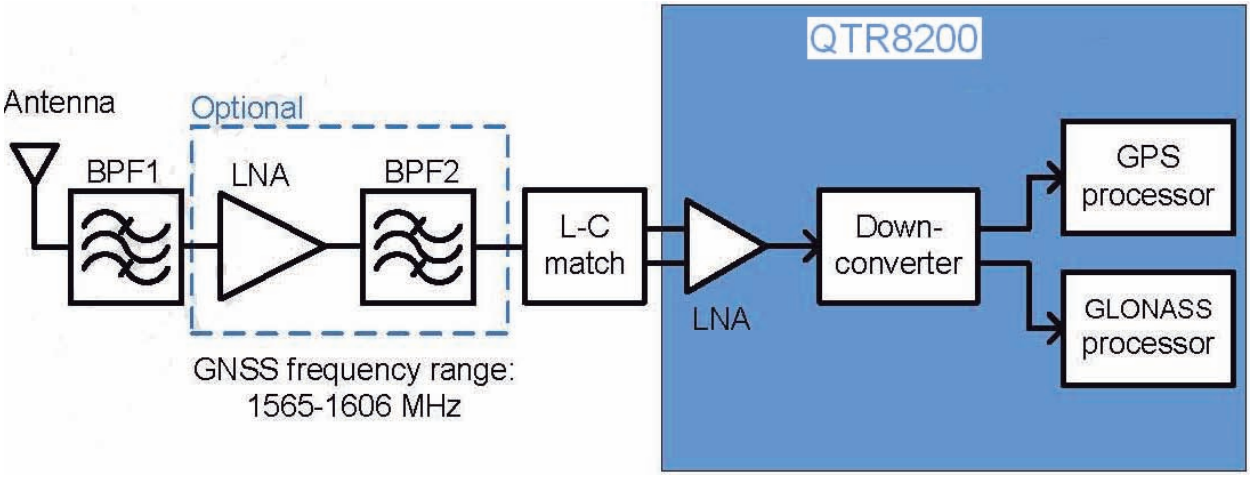
UMTS Tx. Using only PLL1, the LO generation and distribution circuits create the necessary LO signals for nine different frequency converters. The UMTS transmitter also employs the ZIF architecture to translate the signal directly from baseband to RF. This requires FLO to equal FRF, and the QTR8200/8600 IC design achieves this without allowing FVCO to equal FRF. The QTR8200/8600 IC is able to support UMTS 2100/1900/1800/1700 and 850 mode transmitting. This design guideline shows only UMTS 1900 applications.



[Figure 3.3.2] QTR8200/8600 IC transmitters Block Diagram

3.4 GPS RECEIVER

The GPS(GNSS) path has its own antenna and receiver front-end circuit. In some applications, only a bandpass filter and matching network is needed. This filter is similar to the filters used at the DRx inputs – a single-ended input and differential output. The GPS(GNSS) input port has a differential configuration with a 100Ω nominal impedance.



[Figure 3.4] GPS(GNSS) Circuit

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3.5 OFF-CHIP RF COMPONENTS

3.5.1 UMTS PAM (U1003, SKY77701 / U1004, SKY77705-15)

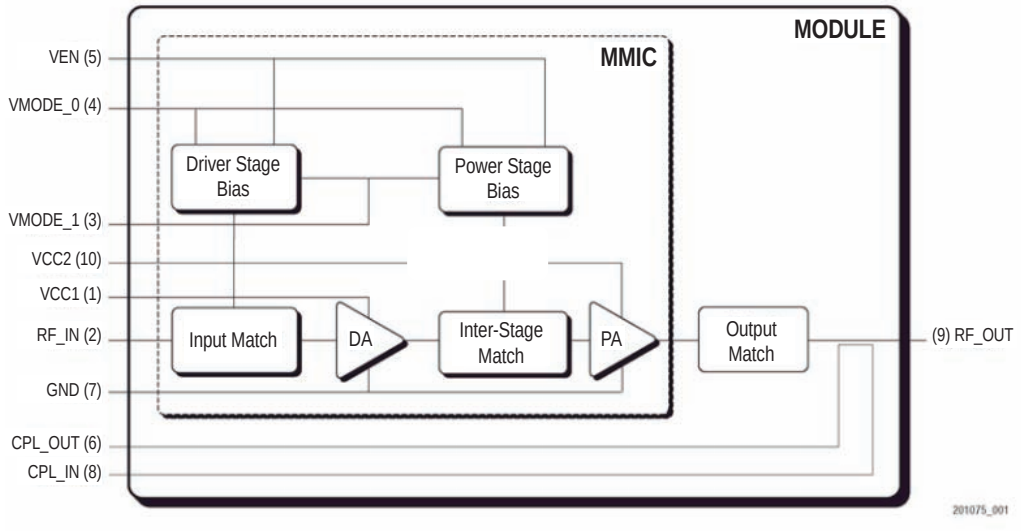
3.5.1.1 U1003, SKY77701

The SKY77701 Power Amplifier Module (PAM) is a fully matched 10-pad surface mount module developed for Wideband Code Division Multiple Access (WCDMA) applications. This small and efficient module packs full 1920–1980 MHz bandwidth coverage into a single compact package. Because of high efficiencies attained throughout the entire power range, the SKY77701 delivers unsurpassed talk-time advantages. The SKY77701 meets the stringent spectral linearity requirements of High Speed Downlink Packet Access (HSDPA), High Speed Uplink Packet Access (HSUPA), and Long Term Evolution (LTE) data transmission with high power added efficiency. A directional coupler is integrated into the module thus eliminating the need for any external coupler.

The single Gallium Arsenide (GaAs) Microwave Monolithic Integrated Circuit (MMIC) contains all active circuitry in the module. The MMIC contains on-board bias circuitry, as well as input and interstage matching circuits. Output match into a 50-ohm load is realized off-chip within the module package to optimize efficiency and power performance.

The SKY77701 PAM is manufactured with Skyworks' InGaP GaAs Heterojunction Bipolar Transistor (HBT) BiFET process that provides for all positive voltage DC supply operation while maintaining high efficiency and good linearity. Primary bias to the SKY77701 is supplied directly from any three-cell

Ni-Cd, a single-cell Li-Ion, or other suitable battery with an output in the 3.2 to 4.2 volt range. No VREF voltage is required. Power down is accomplished by setting the voltage on VENABLE to zero volts. No external supply side switch is needed as typical "off" leakage is a few microamperes with full primary voltage supplied from the battery.



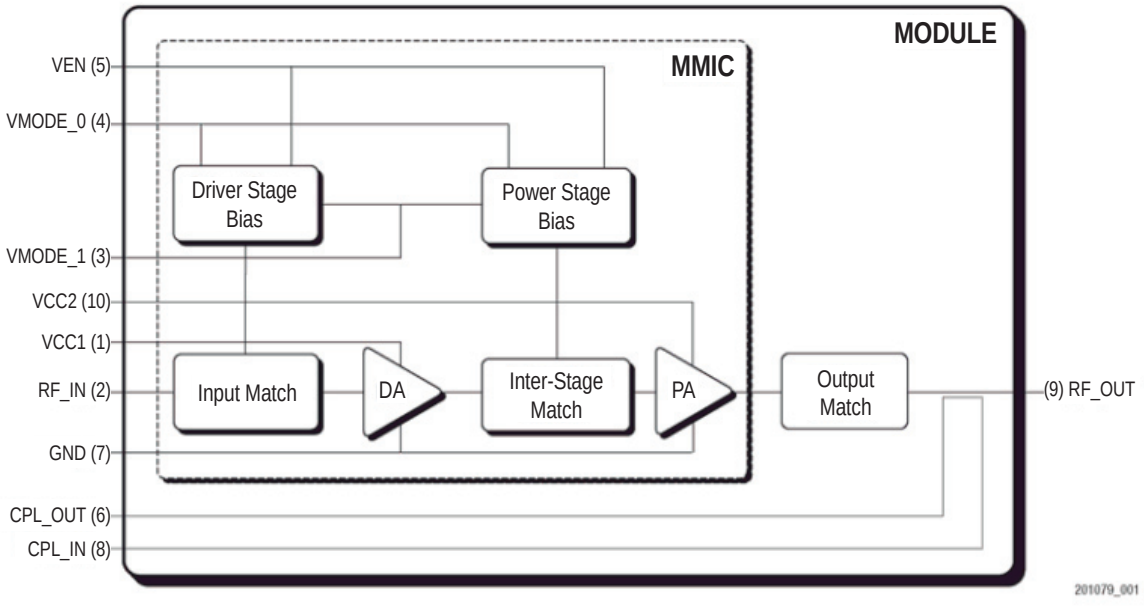
[Figure 3.5.1.1] SKY77701 Block Diagram

3.5.1.2 U1004, SKY77705-15

The SKY77705 Power Amplifier Module (PAM) is a fully matched 10-pad surface mount module developed for Wideband Code Division Multiple Access (WCDMA) applications. This small and efficient module packs full 880–915 MHz bandwidth coverage into a single compact package. Because of high efficiencies attained throughout the entire power range, the SKY77705 delivers unsurpassed talk-time advantages. The SKY77705 meets the stringent spectral linearity requirements of High Speed Downlink Packet Access (HSDPA), High Speed Uplink Packet Access (HSUPA), and Long Term Evolution (LTE) data transmission with high power added efficiency. A directional coupler is integrated into the module thus eliminating the need for any external coupler.

The single Gallium Arsenide (GaAs) Microwave Monolithic Integrated Circuit (MMIC) contains all active circuitry in the module. The MMIC contains on-board bias circuitry, as well as input and interstage matching circuits. Output match into a 50-ohm load is realized off-chip within the module package to optimize efficiency and power performance.

The SKY77705 PAM is manufactured with Skyworks' InGaP GaAs Heterojunction Bipolar Transistor (HBT) BiFET process that provides for all positive voltage DC supply operation while maintaining high efficiency and good linearity. Primary bias to the SKY77705 is supplied directly from any three-cell Ni-Cd, a single-cell Li-Ion, or other suitable battery with an output in the 3.2 to 4.2 volt range. No VREF voltage is required. Power down is accomplished by setting the voltage on VENABLE to zero volts. No external supply side switch is needed as typical "off" leakage is a few microamperes with full primary voltage supplied from the battery.



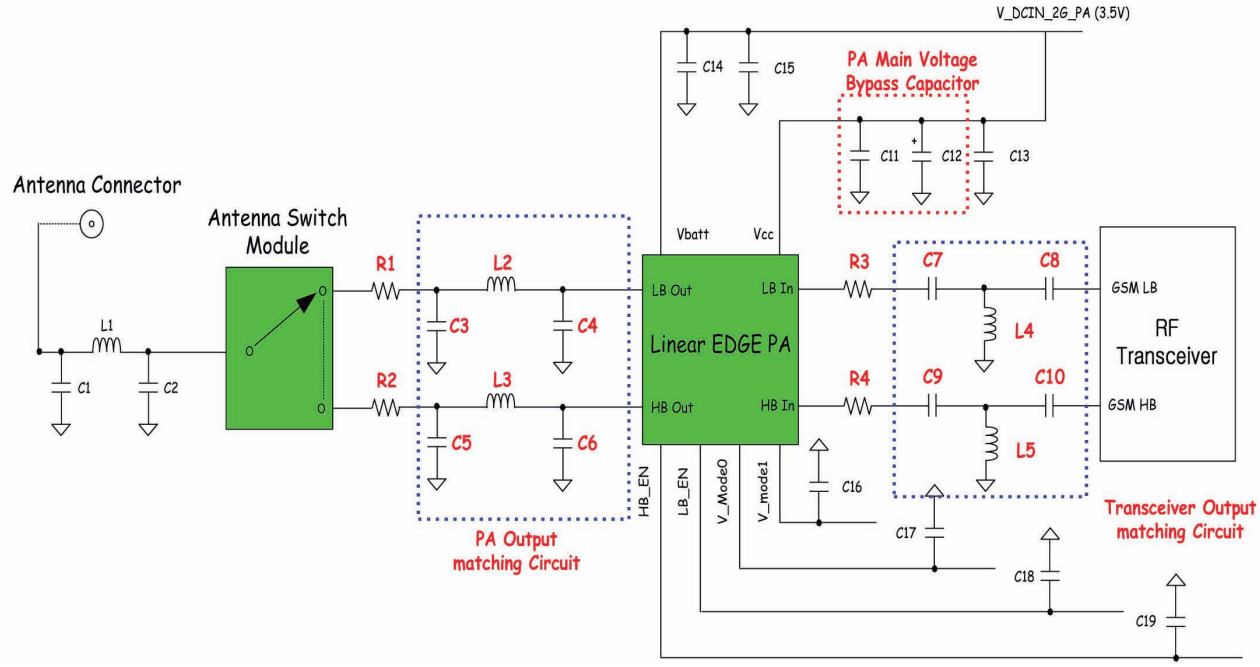
[Figure 3.5.1.2] SKY77705 Block Diagram

3.5.2 GSM PAM (U1000, ACPM-7868-TR1)

The ACPM-7868 is a linear quad-band / multi-mode power amplifier module for both GMSK and 8-PSK modulation schemes. There are two amplifier chains one is to support GSM850/900 bands, and the other is to support DCS1800/PCS1900 bands.

CoolPAM technology, which is Avago Technologies' Power Amplifier technology provides extended talk time with extremely low quiescent current and enhanced efficiency at low and medium power modes.

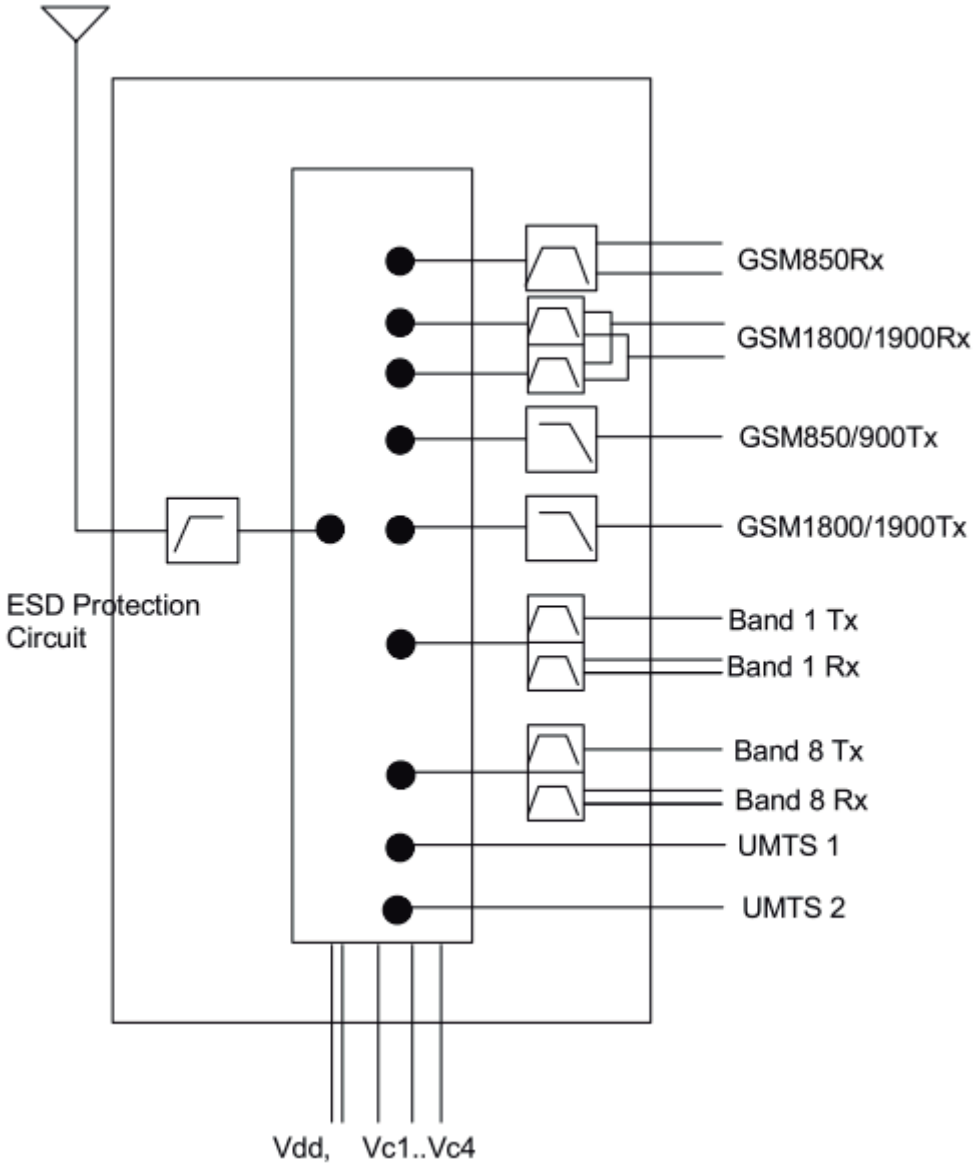
The ACPM-7868 module adopted sixth generation of CoolPAM technology and is designed to enhance power efficiency by using digital power mode control.Two mode control pins provide four power modes for low band and three power modes for high band. Input and output terminals are internally matched to 50Ω. The PA also contains internal DC blocking capacitors for RF input and output ports. The power amplifier is manufactured on an advanced InGaP HBT technology offering state-of-the-art reliability, temperature stability and ruggedness. This module is housed in a cost effective, extremely small and thin 5mmx5mm package.



[Figure 3.5.2] ACPM7868 Peripheral Circuits

3.5.3 Rx Dual Module (FL1000, LMSW54GE-B95TEMP)

LMSW54GE-B95TEMP is transmit and receive, compact from factor for quad-band cellular handsets comprising GSM850/900, DCS1800, and PCS1900 operation. WCDMA switch-through support is provided by two dedicated ports and two none dedicated ports.



[Figure 3.5.3.1] LMSW54GE-B95TEMP Block Diagram

CONTROL LOGIC

Mode	V1	V2	V3	V4
GSM850/900 Tx	1	0	0	1
GSM1800/1900 Tx	0	1	0	0
GSM850 Rx	0	0	1	0
GSM1800 Rx	1	0	1	0
GSM1900 Rx	1	1	1	0
UMTS Band1	1	1	0	0
UMTS Band8	1	0	0	0
UMTS1	1	0	1	1
UMTS2	1	1	1	1

[Figure 3.5.3.2] LMSW54GE-B95TEMP Control Logic Table

3.5.4 19.2MHz XO (X400, 1ZCB19200AB0D)

The RF transceiver circuits use a 19.2MHz reference signal that is generated by the PMIC and applied to the QTR device's XO_QTR pin. This pin's input characteristics are listed in Figure 3.5.4.1.

Parameter	Comments	Min	Typ	Max	Unit
Input frequency range	19.2 MHz signal is required.	–	19.2	–	MHz
Input impedance					
Resistance		–	5	–	kΩ
Capacitance		–	10	–	pF
Input amplitude	AC-coupled	0.8	–	2.0	Vpp

[Figure 3.5.4.1] XO_QTR input performance specifications.

1 .TYPE	DSX221G							
2 .NOMINAL FREQUENCY		19.200000	MHz					
3 .LOAD CAPACITANCE(CL)	7.0	pF						
4 .DRIVE LEVEL	10	uW	+/-	2	uW	(100	uW max.)	
5 .FREQUENCY TOLERANCE	+/-	10	× 10^{-6}	at	25	deg.C	+/- 3	deg.C
6 .SERIES RESISTANCE	70	ohms	max.	/	CL = SERIES			
7 .FREQUENCY CHARACTERISTICS OVER TEMPERATURE	+/-	12	× 10^{-6}	/	-30 deg.C	to	+85 deg.C (ref. +25 deg.C)	
8 .OPERATING TEMPERATURE RANGE	-30	deg.C	to	+85	deg.C			
9 .STORAGE TEMPERATURE RANGE	-40	deg.C	to	+85	deg.C			
10 .MOTIONAL CAPACITANCE(C1)	2.2	fF	typ.	(1.80 fF	to	3.10 fF)		
11 .SHUNT CAPACITANCE(C0)	0.8	pF	typ.	(0.3 pF	to	1.3 pF)		
12 .REFLOW	+/-	2	× 10^{-6}	/	After two reflows			
13 .AGING	+/-	1	× 10^{-6}	/	1	year		
14 .INSULATION RESISTANCE	500	min. at 100V DC						

[Figure 3.5.4.2] 1ZCB19200AB0D Electrical Characteristics

3.5.5 GPS LNA (U1006, ALM-2506)

Avago Technologies' ALM-2506-TR1G is a LNA designed for GPS/ISM/Wimax applications in the (0.9~3.5) GHz frequency range. The LNA uses Avago Technologies' proprietary GaAs Enhancement-mode pHEMT process to achieve high gain operation with very low noise figures and high linearity.

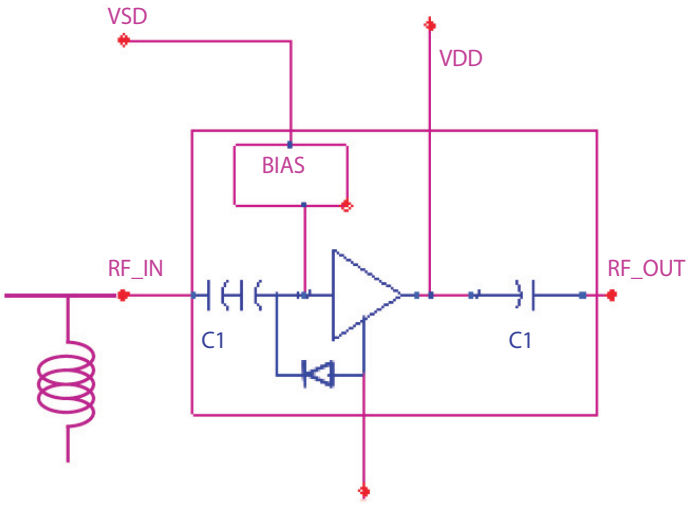
Noise figure distribution is very tightly controlled. Gain and supply current are guaranteed parameters.

A CMOS compatible shutdown pin is included to turn the LNA off and provide a variable bias.

The ALM-2506-TR1G LNA is useable down to 1V operation. It achieves low noise figures and high ain even at 1V, making it suitable for use in critical low-power GPS/ISM band applications.

The module is housed in a cost effective, small and thin package (2x2x1.1mm3).

This part is MSL Class 2 and HBM ESD Level Class 1A.



[Figure 3.5.5] ALM-2506 Functional Block Diagram

3.6 Digital Baseband(MSM8255)

3.6.1 General Description

A. Features (MSM8255)

-Higher integration to reduce PCB surface area, power consumption, time-to-market, and BOM osts while adding capabilities and processing power.

Baseband functions, including multiple hardware cores.

radioOne® RF transceiver functions (Rx and Tx, both eliminating their intermediate requency [IF] components).

Wireless connectivity and analog functions – Bluetooth®, FM radio, audio codec, and ouchscreen ADC support.

Rx inter-stage SAW filters are not required.

-Integrated hardware cores eliminate multimedia coprocessors, providing superior image quality and resolution for mobile devices while extending application times.

Longer run-time for mobile devices over other industry solutions that use companion processors.

Primary and diversity receive paths are designed for equivalent noise-figure performance.

Location-based services and applications, including points of interest, personal navigation, and friend finder; GLONASS, narrow band GPS, and wideband GPS are supported.

In AMSS™ 1.x only, narrow band GPS is supported, while AMSS 2.x will support narrow band GPS + GLONASS.

I2S provides the audio data transfers.

-Single platform that provides dedicated support for all market leading codecs and other multimedia formats to support carrier deployments around the world.

High-quality digital still image camera (DSC) performance with up to 8-megapixel resolution.

MDDI host port to seamlessly connect an embedded LCD.

Ample processing power to support third-party operating systems (OSs).

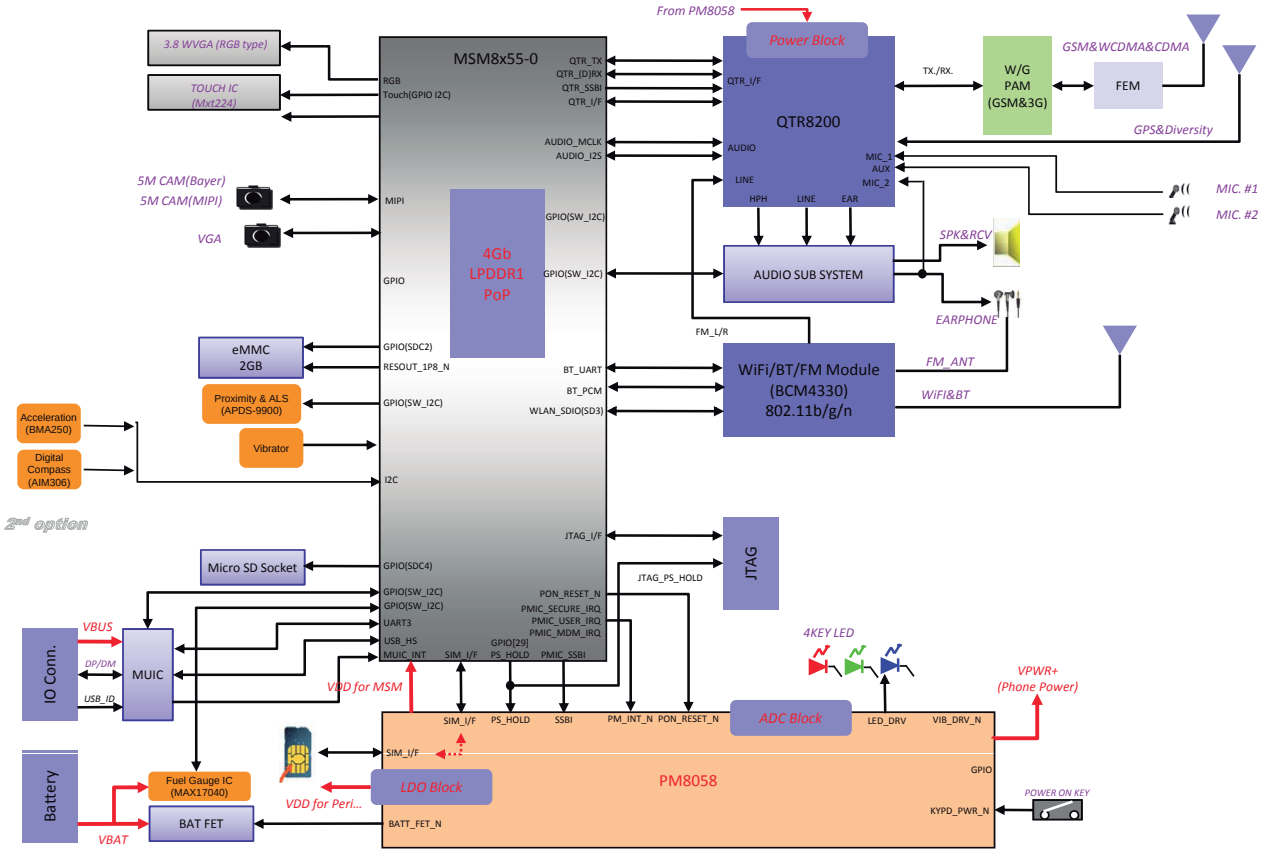
HS-USB core with built-in PHY eliminates additional USB components.

USB-UICC support.

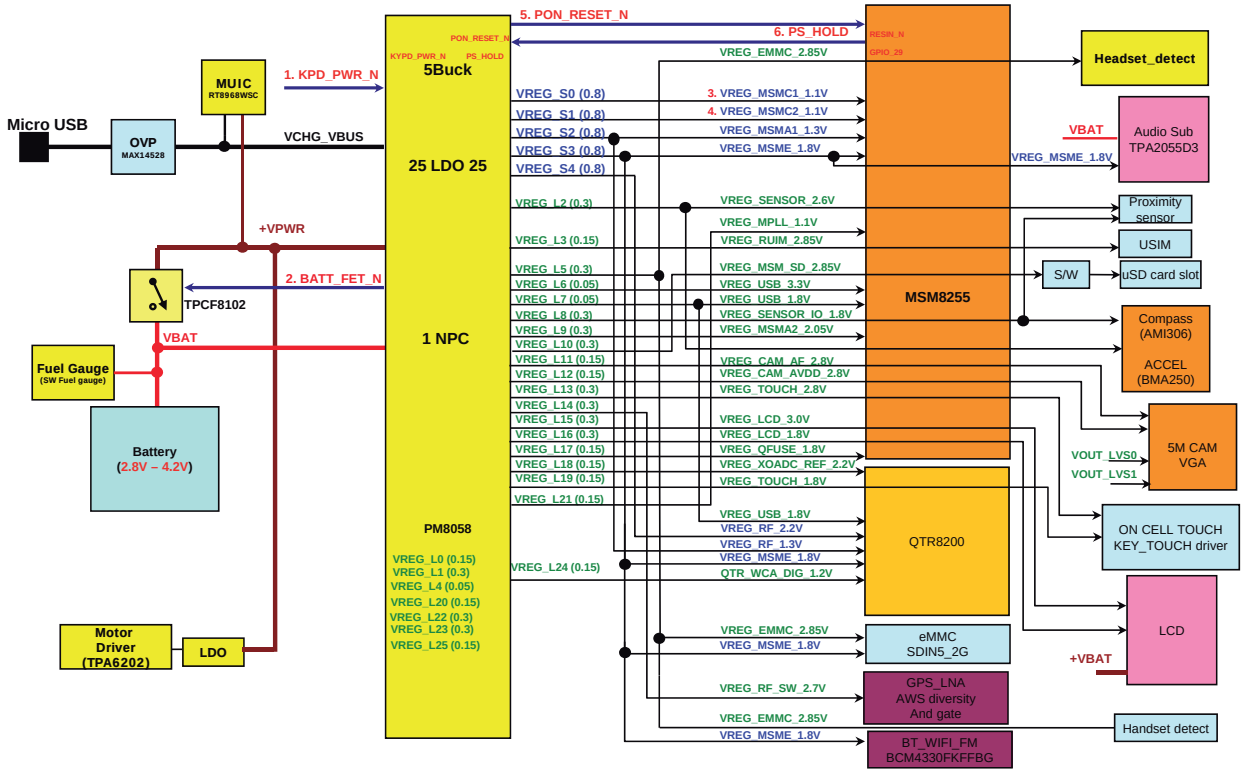
DC power reduction using innovative techniques.

3.7 Hardware Architecture

<System HW Block>



<Power Block>



3.8 Subsystem (MSM8255)

3.8.1 Modem

The modem subsystem consists of blocks directly or indirectly controlled by the modem ARM processor (ARM11). Specifically, all blocks that directly provide the modem functionality (for example, modulation/demodulation, searching, GPS, GSM modulation/demodulation), and all blocks that support the primary modem (such as the MDSP, modem AHB bus, sleep control, and interrupt control blocks). The MSS is comprised of modem core (support for UMTS, CDMA 1x/DO, GSM, and GPS), ARM11 subsystem, interrupt controller, and Qfuse macros.

3.8.2 CGR (codec, graphics, rotator).

The CGR subsystem has the cores that support many of the MSM8x55 device's multimedia functions. It is a collection of the following IPs:

MFCV-720 p (video decode/encode)

Z460 3-D graphics - for advance UI and gaming

Z180 2-D graphics - for 2D rendering and vector graphics

Rotator - HW accelerator for camera, Z460, and MFCV-720 p

VPE (video preprocessing) - added image processing to supplement MFCV-720 p image features

3.8.3 Scorpion uni-processor

The application processor for the MSM8x55 device is the Scorpion processor (SC45U10) which is integrated in the Scorpion uni-processor subsystem. The subsystem supports functions such as CSR support (AHB access is design dependent), timers, primary interrupt controller, adaptive voltage scaling, clock and reset control, and power management (SUPSS and SMPSS).

3.8.4 Applications subsystem

Applications subsystem

The applications subsystem contains the following blocks:

- Audio application DSP (aDSP_a)
- Application data mover (ADM)
- HS-USB controller
- VFE (VFE3)
- MDDI Type II client (MDDIC)
- Camera pad IF register
- Mobile display processor (MDP4)
- Primary and external MDDI v1.2 Type I and II hosts (MDDIH)
- In-line JPEG
- NTSC/PAL TV OUT encoder (TV encoder)
- Video DAC with macrovision support (Svideo DAC)
- Low power audio (LPA)
- MIDI
- AHB2AXI bridge arbitration for MDDIH (primary, external) and USB

In the application subsystem, five bus masters are connected to AXI bus local interconnect:

- Application data mover
- ADSP audio (aDSP_a)
- HS US/primary MDDI host/external MDDI host (prearbitrated)
- VFE (VFE3)
- Mobile display processor (MDP4)
- MIDI

3.8.5 Peripheral

The peripheral subsystem contains the peripherals shared by the modem ARM processor (ARM11 data access only), the application processor (Scorpion), the mobile display processor (MDP4), the application data mover (ADM), and aDSP audio (ADSP_A). The peripheral bus has three bus partitions (FPB1, FPB2, and FPB3 [SPB]) that allow concurrent access by different masters.

Partitioning was done in a way to help BW capacity on the system. The application data mover is used to move data to/from the high-bandwidth peripherals. Low bandwidth peripherals (such as the UART, I2C, and GPIO) and some chip configurations (certain block control registers) reside on the slow peripheral bus, sourced by a bridge tied to the fast peripheral bus.

3.8.6 WCDMA Subsystem

The MSM8255 WCDMA subsystem performs the data conversions and signal processing necessary to maintain the WCDMA air interface between the handset and the base station (and also the WCDMA network). The subsystem components include:

-Searcher engine
-Demodulating fingers
-Combining block
-Frame deinterleaver
-Viterbi decoder
-Reverse link subsystem
-Turbo decoder

On the forward link traffic channel, the WCDMA subsystem searches, demodulates, and decodes incoming pilot, sync, paging, and traffic channel information. It extracts low bit-rate packet data from the forward link traffic channel and sends the packet data to the vocoder for processing. On the reverse link, the WCDMA subsystem processes the packet data from the vocoder and modulates the reverse traffic channel.

3.8.7 GSM Subsystem

The MSM8255 IC includes a GSM core that performs the data conversions and signal processing necessary to maintain the GSM air interface, including PA gain control for GPRS support. In GSM mode, the power profile ramps up before the burst and ramps down afterward. In GPRS mode, transmit bursts can occur in as many as four sequential slots and the PA must be ramped up and down smoothly between each slot, holding the desired output power level during each burst. GSM support includes:

-GSM release '99 (circuit switching)
-GPRS (packet switching)
-EDGE E2 power class for 8 PSK

3.8.4 RF Interface

The RF interface communicates with the mobile station's external RF and analog baseband circuits. Signals to these circuits control signal gain in the Rx and Tx signal path and maintain The system's frequency reference.

3.8.5 Single-wire serial bus interface (SSBI)

The MSM8255 device's SSBI is designed specifically to be a quick, low pin count control protocol for QUALCOMM's QTR8200 and PM8058 ASICs. Using the SSBI, the QTR8200 and PM8058 devices can be configured for different operating modes and for minimum power consumption, extending battery life in Standby mode. The SBI also controls DC baseband offset errors.

3.8.6 Audio function

The audio core in the MSM8x55 device includes four I2S interfaces and a PCM interface to connect to an external device. The blocks are summarized below and shown in Figure 6-20. The audio core also includes an internal low power audio and MIDI hardware accelerator. Both interfaces will be added to a future revision of this document.

- Independent Tx and Rx I2S interfaces (MI2S_CODEC) dedicated for a stereo wideband codec
- Multiple I2S (MI2S) interface to support up to 8 channels of audio
- AUX_CODEC that contains:
  - I2S interface to connect to a stereo ADC or stereo DAC I2S capable.
  - AUX_PCM interface to connect to an external mono codec.
- Low power audio core to enable very low power for multimedia playback.
- MIDI hardware accelerator core to support CMX 5.x features.

3.8.8 Mode Select and JTAG Interfaces

The MSM8x55 IC JTAG interface conforms to the IEEE 1149.1A-1003 standard specifying components that accept test instruction and data inputs, then provide the respective results as outputs in a serial format. The standard requries a test access port and a boundary-scan architecture to fulfill these requirements

- This test circuitry is used for board-level testing, and confirms the following:
- That each component on the board performs its function correctly
- That all components are interconnected in the correct manner

That the entire design begaves as intended These confirmations are achieved using a boundary-scan architecture that includes a shift register stage (or cell) adjacent to each component pin so that signals at the component's boundaries can be tested, controlled,and observed. The boundary-scan cells are connected serially as a long chain, and behave as an overall shift register.

3.8.9 General-Purpose Input/Output Interface

This device has a number of general-purpose programmable input/outputs (GPIO). These inputs and ouputs need to be protected form non-secure master, CPUs, and processes. Secure access privileges for the GPIOs are always controlled by the root-of-trust processor. This may include programming the pull-up/pull/down/keeper usage, the drive strength, and any alternate hardware use of each pad.
Specifically the non-trusted masters must be prevented from reconfiguring GPIO channels to:

- ensure critical GPIOs/channels are not disabled.
- ensure that non-secure observation of secure GPIOs does not occur.
- ensure that non-secure observation of interrupts associated with secure GPIOs does not occur.
- ensure that when Scorpion is the root-of-trust processor, the MPROC maintains a region of GPIOs unobservable/inaccessible to other non-root-of-trust masters.
- ensure the alternative function, intended be used only under certain specific circumstances is not selected with malicious intent.

3.8.10 UART

The MSM8x55 devices UART can be used for applications such as:

- Serial data interface that conforms to the RS-232 interface protocol
- Handset's serial data port for test and debug
- External keypad or ringer interface

- With EEPROM or flash memory-used to load and/or upgrade system software.

3.8.11 USB

The MSM8x55 IC supports USB interfaces using two controller:

The primary controller is the high-speed USB(HS-USB) port with an integrated physical layer(PHY).This HS-USB port is also capable of supporting USB operations at low speed and full speed

- The secondary controller is the full-speed USB-UICC port

3.9 Power Block

3.9.1 General

The MSM8x55 device is powered by a Qualcomm powerOne™ series PM8058™ power management IC. The power source is selected from either the battery, external charger, adaptor, or USB device, and then the IC generates all the regulated voltages needed to power the handset electronics. The main battery and backup coin-cell voltages are monitored, and charging is conducted as needed.

In addition to these basic power functions, the PMIC also provides:

- Housekeeping functions

  Analog multiplexer and ADC that allows monitoring of IC-level and handset-level sensors, including the XO thermal status

  System clocks, including the MSM IC's 32 kHz sleep clock and 19.2 MHz operating clock

  Realtime clock and associated alarms

- User interfaces

  Current drivers for an auto trickle-charge indicator LED

  Pulse generator output for controlling external LED and backlight drivers

  Vibration motor driver for silent incoming call alerts

  Two-channel (stereo, 500 mW per channel) speaker driver for far-field speakers

  Headset send/end detection and microphone biasing

- IC-level interfaces

  Monitoring of triggering events and coordination of the poweron and poweroff sequences

  Level translators for dual-voltage UIM support

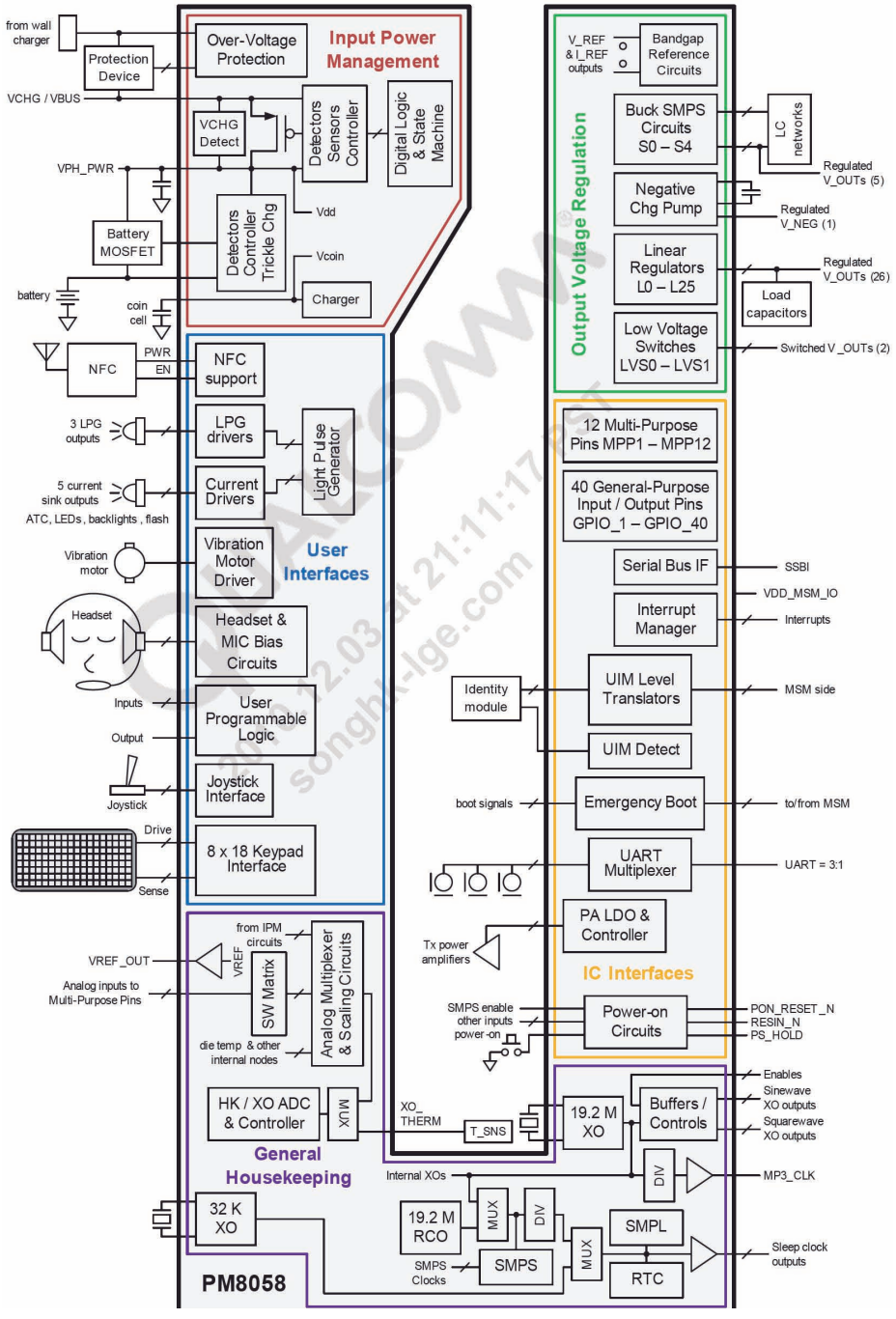
  PA controllers

Major power components are :

PM8058 : Phone main PMIC

3.9.2 PM8058

The PM8058 device (Figure 3.9.2) integrates all wireless handset power management, general housekeeping, and user interface support functions into a single, mixed-signal IC. Its versatile design is suitable for CDMA, UMTS, or GSM phones, and other wireless products, such as data cards and PDAs. The following paragraphs provide a high-level description of the device



[Figure 3.9.2] PM8058 functional block diagram

The PMIC accepts power from the usual sources:

- An external wall charger – for operating the handset electronics and charging its battery; thePMIC supports overvoltage protection up to +28 V.
- An external USB device – for operating the handset electronics and charging its battery.
- The handset's main battery – the usual power source for operating the handset electronics.
- The handset's coin cell backup or keep-alive capacitor – only used when none of the other power sources are available; very limited functionality (no handset communications).

The PMIC monitors and controls the power sources, detecting which sources are applied andverifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages. Thermal conditions of the integrated pass transistor and its total current are monitored and reported to a state machine that coordinates PM operations, including autonomous charging of the main battery. Software control via the Mobile Station Modem™ (MSM™) or Qualcomm Single-Chip™ (QSC™) device is also available, identical to previous generation PMICs.

Other input power management circuits provide VDD or VBAT voltage regulation (defined by the PMIC operating mode), current monitoring and over-current protection, battery voltage alarms with programmable thresholds, VDD collapse protection, undervoltage lockout protection, and automated recovery from sudden momentary power loss (SMPL).

On-chip voltage regulators generate 32 programmable output voltages using a combination of 5 switched-mode power supplies, 26 low-dropout linear regulators, and 1 negative charge pump – all derived from a common trimmed voltage reference. Key regulators support dynamic voltage scaling (DVS), and most allow low-power modes to minimize dissipation. Two low-voltage switches are available for gating the power supplies to external circuits.

The device's general housekeeping functions include input switch matrices and analog multiplexing that selects from several possible inputs; the selected signal is routed to the on-chip HK/XO ADC. A set of input scaling circuits extends the acceptable range of input voltages and increases the effective ADC resolution. These circuits are used to monitor on-chip functions such as the die temperature and bandgap reference voltage, key voltage nodes (such as VCHG, VBAT, etc.), or system parameters such as temperatures and battery ID.
Various oscillator, clock, and counter circuits are provided to initialize and maintain valid pulse waveforms and measure time intervals for higher-level handset functions. Four independent XO controller/buffer circuits are available, allowing individual turn-on, warmup, and deglitched clock sources for MSM, QSC, and RFIC devices, plus non-phone circuits such as wireless-LAN

(802.11), Bluetooth®, HS-USB, and MP3. Having multiple controller and buffer circuits allows the non-phone devices to run, even when the phone circuits are in their sleep modes. Multiple sleep clock outputs are available, and an external 32.768 kHz sleep crystal is still supported, but the 19.2 MHz XO and on-chip dividers can be used instead. An on-chip RC oscillator is available for backup; the main oscillators are monitored, and circuits switch over to the RC output automatically if needed. A realtime clock keeps track of time and generates programmed alarms.
Other general housekeeping circuits provide adjustments to minimize crystal oscillator frequency errors, implement smart thermal control (a multistage over-temperature protection scheme), and provide buffered 1.25 VREF outputs.

Handset-level user interfaces are also supported, thereby reducing external circuitry and board space.
An eight channel light pulse generator (LPG) supports blinking or strobing LEDs and backlights. A selection of current driver outputs are available: up to three programmable, 5 V tolerant backlight/flash drivers (300 mA), up to three programmable LED drivers (40 mA), one trickle charging indicator, and three LPG controls for external drivers. Like previous generation PMICs, a programmable vibration motor driver is included (1.2 to 3.1 V operation in 100 mV increments).

Other (new) user interface functions include three one-touch headset controllers (headset send/end detection and microphone bias), near field communicator support, a keypad interface capable of supporting an 18×8 matrix, an external switch detection that supports headset and flip switches, user programmable logic, and joystick support.

IC-level interfaces include the single-wire serial bus interface (SSBI) used by the MSM or QSC device to control and status the PMIC. This bus is supplemented by three interrupt managers for time-critical modem, user application, and secure application information. Another dedicated IC interface circuit monitors multiple trigger events and controls the poweron/poweroff sequences.
Three control lines (OPT_x) can be used to set optional PMIC hardware configurations to best support particular chipsets and applications. As usual, the PMIC supports and orchestrates soft and hard resets, but this latest offering also includes an external control (via GPIO) for enabling an external SMPS.
Other (new) IC-interface functions include UIM detection (via GPIO) along with UIM level translators (via MPPs and GPIOs), a PA controller (with its own supply regulator) that supports multiple Tx power amplifiers (four UMTS PA_ON, two GSM PA_ON, and two PA range controls), a 3:1 UART multiplexer (via GPIOs), and support for emergency boot.

The PMIC includes twelve multipurpose pins, eleven that can be configured as digital inputs or outputs, level-translating bidirectional I/Os, analog multiplexer inputs, or buffered VREF analog outputs. And for the first time, this PMIC integrates 40 general purpose input/output (GPIO) pins that can be configured as digital inputs or outputs or level-translating I/Os. Note that the GPIOs are much faster than MPPs for high-speed digital switching.

This mixed signal BiCMOS device is available in the 191-pin nanoscale package (191 NSP) that includes several ground pins for electrical grounding, mechanical strength, and thermal continuity.

3.9.3 Charging control

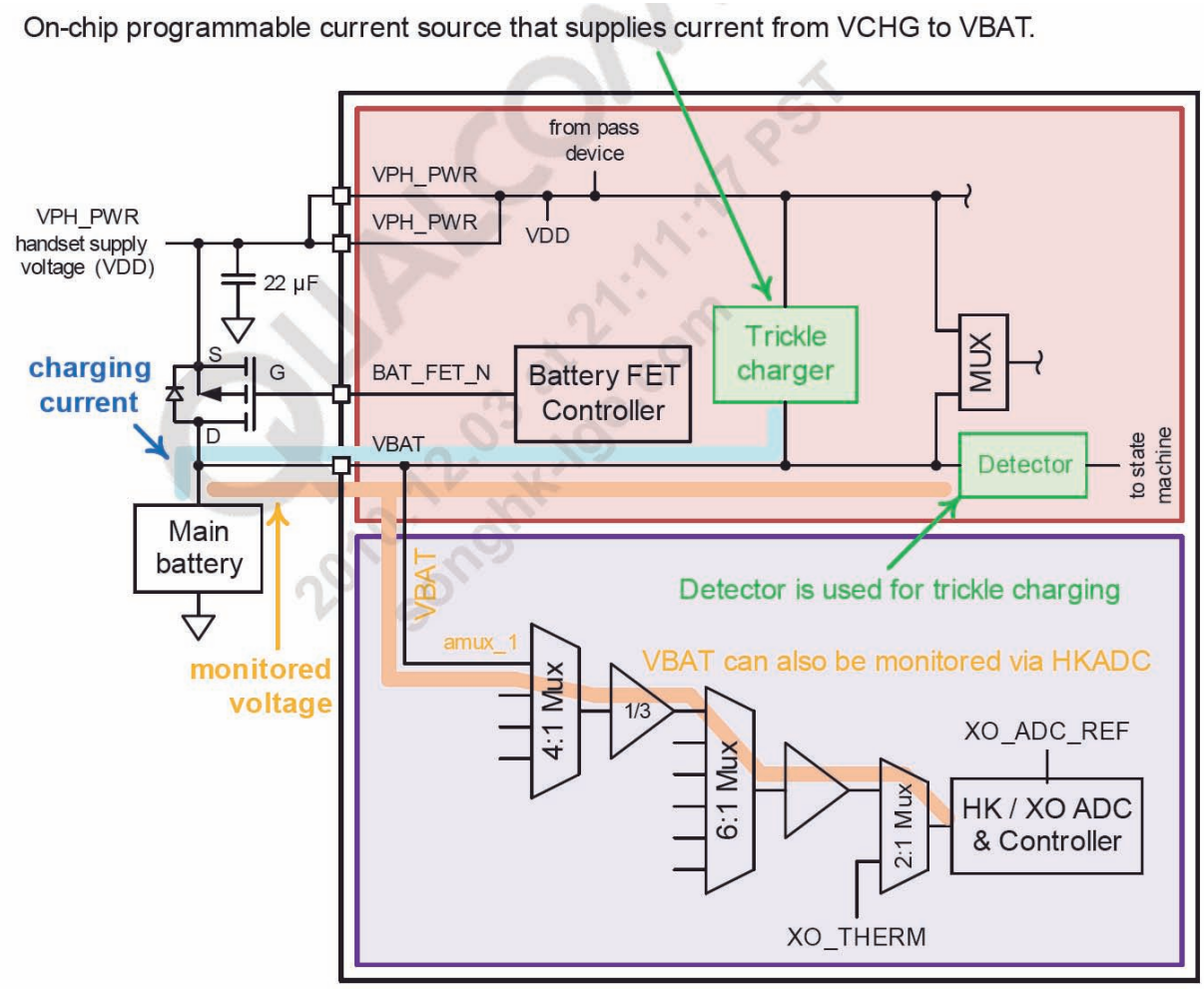
The PMIC provides two methods for main battery charging:

- A software-controlled method that is identical to previous generations of PM products
- An autonomous method – where the PM circuits conduct charging under the direction of a state machine without software intervention

When using the software-controlled method, the PMIC provides as many as four charging techniques: trickle, constant current, constant voltage, and pulse. Battery voltage, external supply voltage, and total detected current measurements are available to software through the on-chip analog multiplexer and HK/XO ADC. This allows software to monitor charging parameters, make decisions, and control the charging process.

3.9.3.1 Trickle Charging

Trickle charging of the main battery, powered from VDD, is provided by the PMIC. This mode is used to raise a severely depleted battery's voltage to a level sufficient to begin fast charging.
Fast charging with a high-current supply should not be attempted on a deeply discharged battery – the battery would draw excessive current, pull the VDD voltage down, and possibly cause a handset malfunction or shutdown due to an undervoltage lockout condition. If the PMIC implements current limiting, the excessive current would combine with the potentially large voltage drop across the charging pass transistor to generate unwanted heat within the handset as well. To avoid these problems the PMIC provides a constant, low-current charging mode – trickle charging



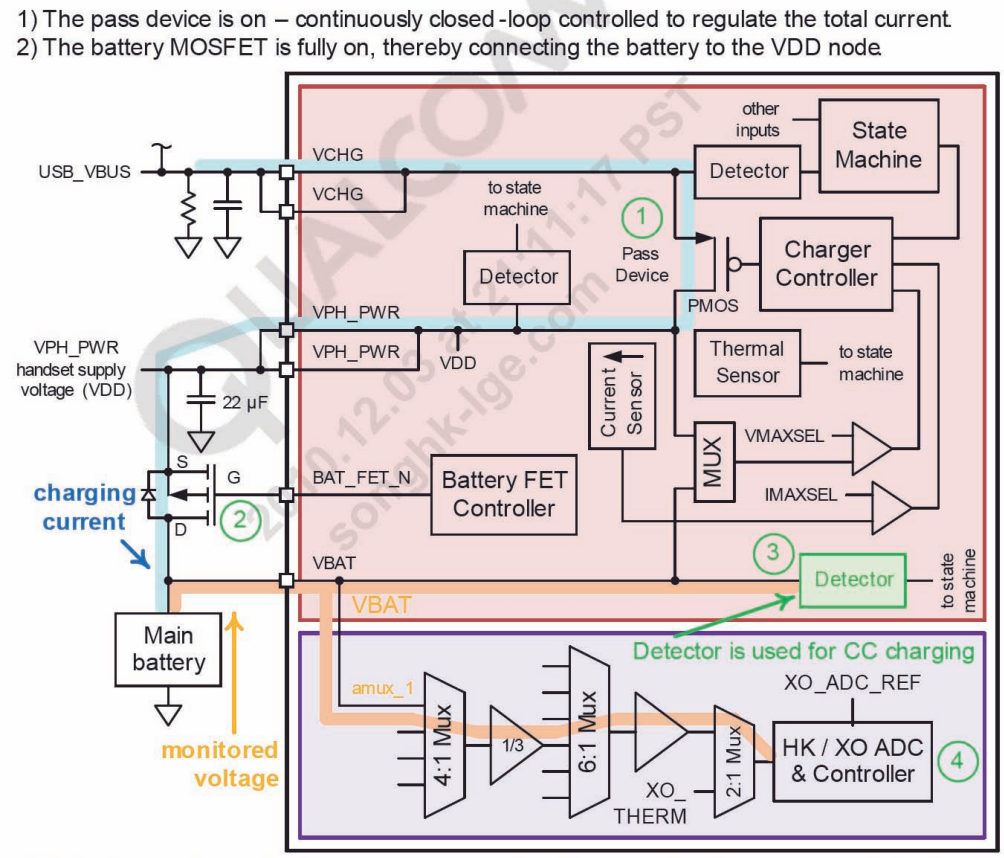
- Trickle charging can be enabled through software (or automatically by the state machine) and should be used until the main battery reaches its desired threshold, usually about 3.2 V.
- Fast charging should not be attempted with VBAT between 2.55 and 3.2 V because the regulators can drop out of regulation.
- Trickle charging is terminated based upon battery voltage measurements at the detector and the battery type – there is no preset termination threshold.
- Software sets the desired trickle charging current (10 to 160 mA in 10 mA increments).

[Figure 3.9.3.1] PM8058 Charging Flow (TC Charging)

3.9.3.2 Constant Current Charging

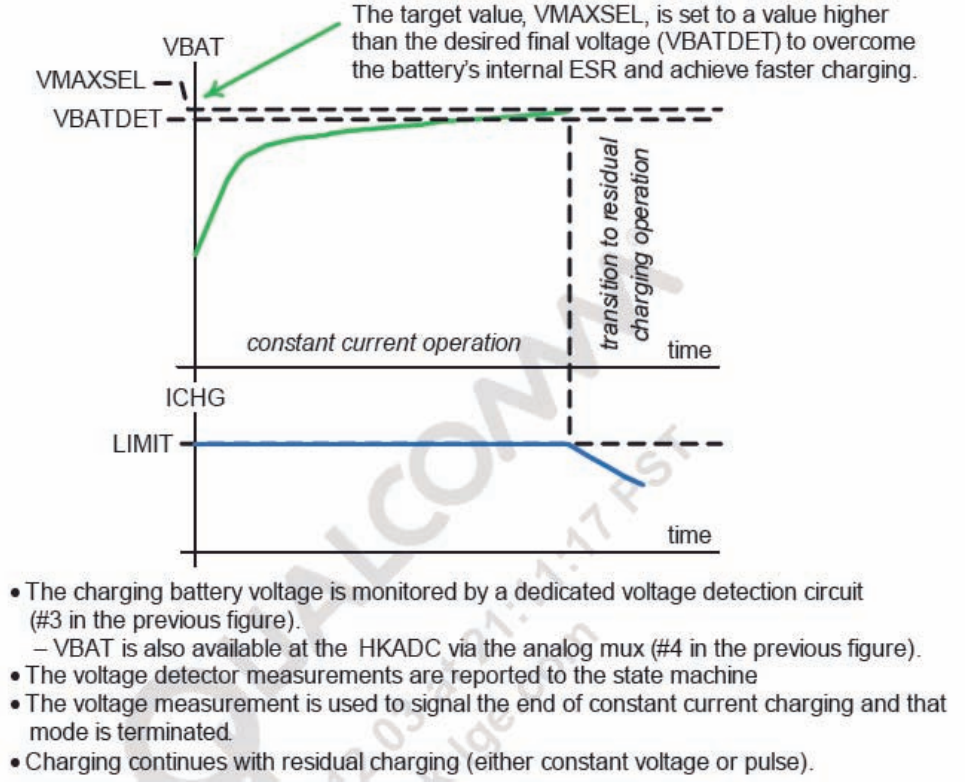
The PMIC supports constant current charging of the main battery by closing the battery MOSFET (connecting the battery to VDD), and closed-loop controlling the charging pass transistor. If current limiting is not implemented by the external supply, the closed-loop control regulates the total current (handset electronics plus charging current) to match the programmed value (IMAXSEL).

Software monitors the charging process as described earlier and continues the constant current mode until the battery reaches its target voltage. Charging of Li-ion batteries require further charging using constant voltage or pulse techniques for top-off and maintenance.



- The battery is charged with a constant current level that is set by the current regulation loop or the current-limited external supply.
- As VBAT rises and approaches its desired value, the charging current begins to decrease.
- This is the end of constant current charging and the beginning of residual charging – as explained in the following figure.

PM8058 Charging Flow (CC Charging) : 1/2



PM8058 Charging Flow (CC Charging) : 2/2

3.9.3.3 Constant Voltage Charging

PMIC support of main battery constant voltage charging is very similar to its constant current mode: the battery MOSFET is closed and the charging pass transistor is closed-loop controlled.

But in this case, the closed-loop control regulates the voltage at VBAT to match the programmed value (VMAXSEL). This ensures the most accurate final battery voltage – Li-ion battery

manufacturers recommend a voltage accuracy of 1% or better at the end of charge. The battery voltage is constant (or nearly so) while the charging current decreases exponentially for the remaining charge process

3.9.3.4 Pulse charging

After constant current charging of a Li-ion battery is finished, the charging continues using either constant voltage or pulse techniques.

There are two options for implementing pulse charging:

1. By switching the battery MOSFET on and off until the battery's open circuit voltage stays above the VMAXSEL setting.

2. By switching the pass device on and off. This option is the preferred method for all designs. Pulse charging, compared to constant voltage, provides better battery voltage accuracy, reaches full charge more quickly, and dissipates less transistor power when switching from constant current charging. Pulse charging is enabled through software and uses the same hardware as constant-current or constant-voltage charging, but repetitiously opens and closes the charging pass transistor (or battery transistor) to deliver current pulses to the battery.

3.9.3.5 Autonomous charging

The PMIC includes autonomous charging, a feature that lets the power management circuits conduct battery charging with little intervention from the handset software. The autonomous charging algorithm is implemented in a state machine; once it begins, it executes a sequence of predetermined states until charging is completed.

3.9.3.6 LG-E730 Charging Specification

-Charging Method : CC & CV (Constant Current & Constant Voltage)
-Maximum Charging Voltage : 4.2V
-Maximum Charging Current : 700mA
-Nominal Battery Capacity : 1500mAh
-Charging time : Max. 3h 30min
- Full charge indication current (icon stop current) : 50mA

3.9.3.7 LG-E730 battery bar icon display

Battery Bar Number	Specification	
BAR 6 (Full)	90% over	Remain %
BAR 6 --> 5	90% → 89%	
BAR 5 --> 4	70% → 69%	
BAR 4 --> 3	50% → 49%	
BAR 3 --> 2	30% → 29%	
BAR 2 --> 1	15% → 14%	
BAR 1 --> 0	5% → 4%	
Low Battery Pop-up	4% ~ 15% : One Time popup (No call)	
Critical Low Battery Pop-up	0% ~ 3% : Popup at every level change (No call)	
POWER OFF	0%	

LG-E730 battery bar specification

3.10 External memory interface

3.10.1 MSM8255

The memory interface consists of two high-speed, high-performance memory slave interfaces: EBI0 and EBI1; and one low speed general-purpose/NAND/NOR memory interface: EBI2.

The EBI0 and EBI1 is an external bus interface with support for high-speed 16-bit or 32-bit LPDDR1 and LPDDR2 SDRAM device. The DDR1 target speed is 192 MHz while the DDR2 is at 266 MHz in normal mode.

The EBI2 is an external bus interface with support for the low-speed memory interface. The target frequency is in the range of less than 80 MHz.

The EBI0 and EBI1 interfaces act as slave devices to all of the bus masters in the MSM device.

They can operate either synchronous or asynchronous to the AXI bus. The masters arbitrate to gain access to the EBI0 and EBI1. Once access is granted, the selected master issues a transaction to the selected memory interface. Bus masters are connected to the EBI0 and EBI1 through an AXI bus bridge and communicate according to a 64-bit, non-blocking AXI bus protocol. The AXI bus bridge provides the arbitration logic for all of the bus masters.

The EBI2 is an external bus interface to support memory devices, such as NAND and asynchronous SRAM, and peripheral devices, such as the LCD, etc. Both the EBI2 and the NAND flash controllers reside on the 32-bit peripheral AHB bus.

3.11 H/W Sub System

3.11.1.1 QTR8200 (WCDMA_Tx, GSM_Tx/Rx)

MSM8255 controls RF part(QTR8200) using these signals.

-QTR_RF_SSBI1 : single-wire serial bus interface #1; Tx and GNSS

-QTR_RF_SSBI2 : single-wire serial bus interface #2; PRx and DRx

-QTR_RF_ON : Control signal for enabling RF transmitter circuits

-QTR_PRX_BB_I/Q_M/P : I/Q for T/Rx of RF

-QTR_DAC_REF: Reference input to the MSM Tx data DACs

3.11.1.2 The others

PA_ON : TX Power Amp Enable

ANT_SEL[0-3] : Ant Switch Module Mode Selection(WCDMA,GSM Tx/Rx,DCS-PCS Tx/Rx)

PA_R[0-1] : Power amplifier range control

3.11.1.3 ALM-2506 (GPS LNA)

* GPS_LNA_EN : GPS LNA Enable Signal

3.11.1.4 BCM4330FKFFBG (BT / WiFi / FM chip)

WiFi

* WLAN_CMD : WLAN SDIO Command Line.
* WLAN_CLK : WLAN SDIO Clock Input.
* WLAN_SDIO[3:0] : WLAN SDIO Data Line.
* WLAN_RESET_N : Low asserting reset for WLAN core.
* WLAN_HOST_WAKEUP : WL_HOST_WAKEUP signal output.

BT

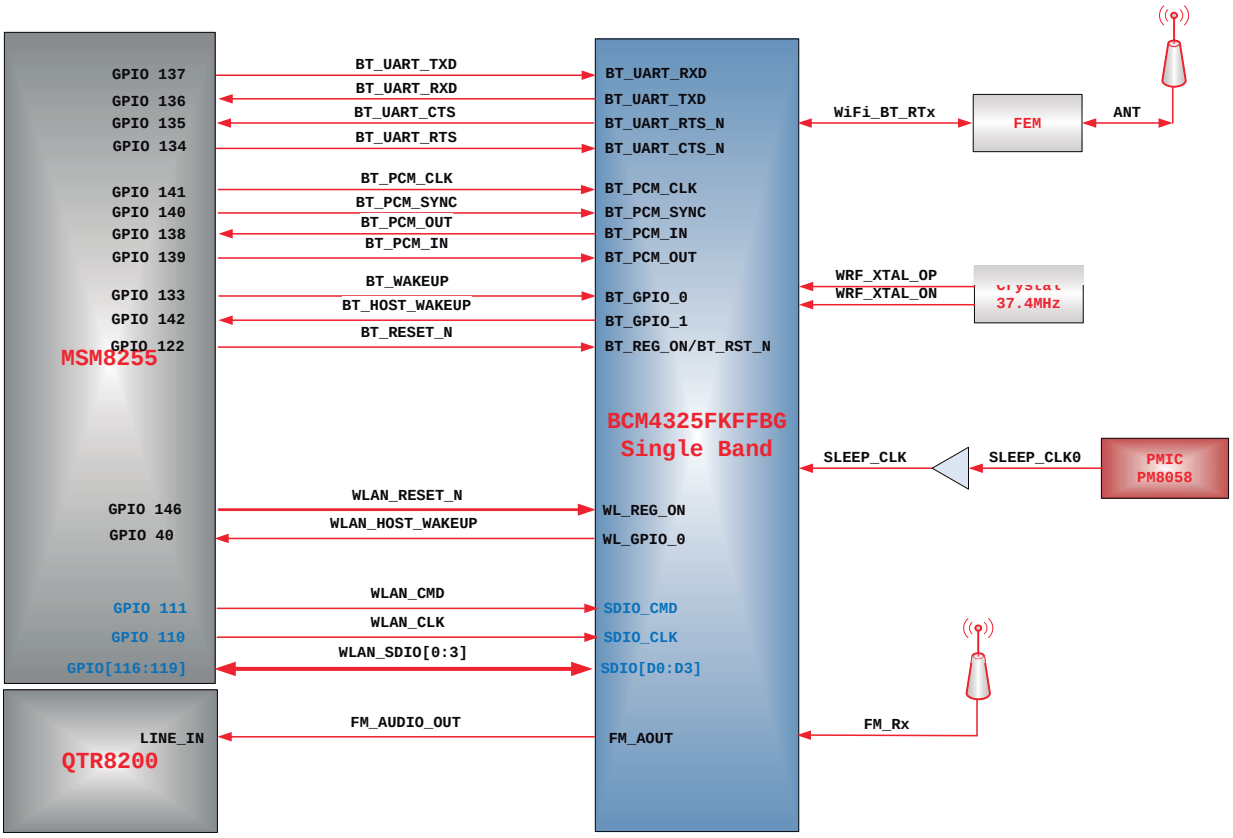
* BT_UART_RXD : Bluetooth UART Serial Input.
* BT_UART_RTS : Bluetooth UART Request to Send. Active-low request.
* BT_UART_CTS : Bluetooth UART Clear to Send. Active-low clear.
* BT_UART_TXD : Bluetooth UART Serial Output.
* BT_PCM_CLK : BT PCM clock, can be PCM-master (output) or PCM-slave (input).
* BT_PCM_IN : BT PCM data input.
* BT_PCM_SYNC : BT PCM sync signal, can be PCM-master (output) or PCM-slave (input).
* BT_PCM_OUT : BT PCM data output.
* BT_WAKEUP : BT Wakeup Input.
* BT_HOST_WAKEUP : BT Host Wakeup Output
* BT_RESET_N : Low asserting reset for BT core.

Common

* SLEEP_CLK : LPO clock (32.768kHz) input. Used for low-power mode timing.

FM Radio

* FM_ANT : FM RF input.
* SLEEP CLK : External reference oscillator input. (32.768KHz)
* FM_R : FM analog audio output channel 1.
* FM_L : FM analog audio output channel 2.

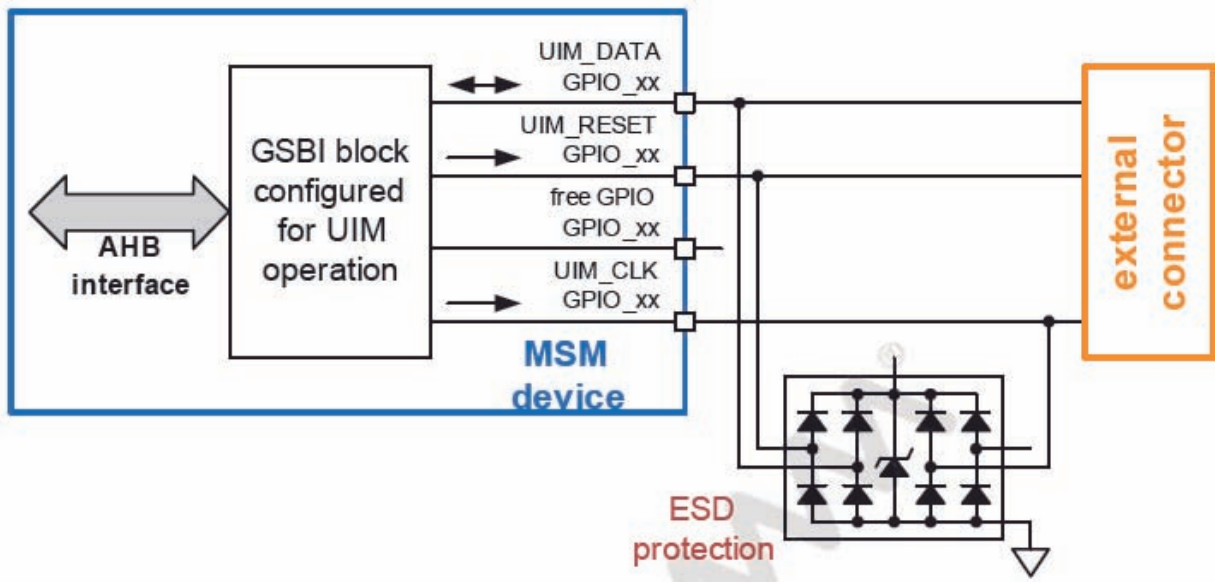


[Figure 3.11.1] Wi-Fi/BT/FM Interface Block Diagram

3.11.2 MSM Sub System

3.11.2.1 UIM interfaces

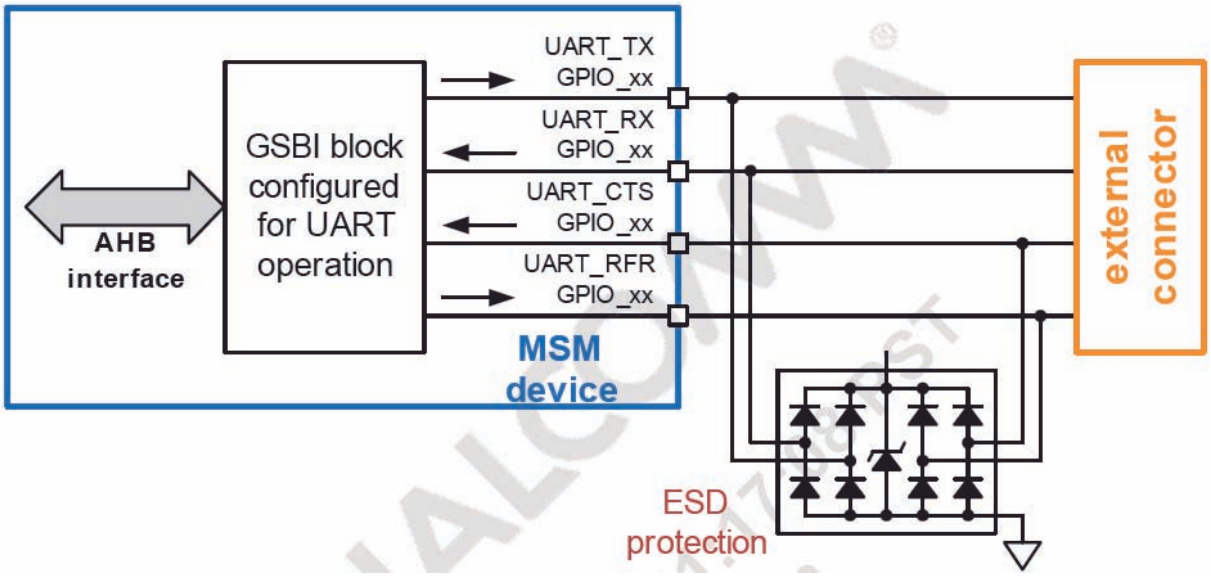
The reference design includes a primary UIM connection via the UIM2 interface (GPIOs 53, 54, and 57) and a secondary UIM connection via the UIM1 interface (GPIOs 49, 50, 52). The primary UIM interface supports dual-voltage UIM modules. while the secondary UIM interface supports only 1.8 V cards.



[Figure 3.11.2.1] Example SIM connection

3.11.2.2 UART interfaces

One of the GSBI ports configured for UART operation is used internally to support Bluetooth (where applicable). The reference design did not include any external UART connections.



[Figure 3.11.2.2] Example UART connection

3.11.2.3 USB interfaces

The universal serial bus (USB) is an interconnection standard widely supported by the electronics industry. The USB 2.0 specification defines three operating data rates: low-speed (1.5 Mbps); full-speed (12 Mbps); and high-speed (480 Mbps).

When two devices are connected via a USB interface, one device must act as a host, and the other device must act as a peripheral. The host is responsible for initiating and controlling traffic on the bus. The USB specification requires personal computers (PCs) to act as hosts, and other devices such as printers, keyboards, and mice to act as peripherals. The OTG supplement of the USB 2.0 specification creates a new class of devices called OTG devices. OTG devices can act as either hosts or peripherals, depending on how they are connected and/or used. The MSM8x55 device supports host and peripheral modes within the OTG supplement, with the exception of session request protocol (SRP) and host negotiation protocol (HNP).

The MSM8x55 IC supports one HS USB port with built-in PHY.

The MSM8x55 IC supports USB interfaces using two controllers:

- The primary controller is the high-speed USB (HS-USB) port with an integrated physical layer (PHY). This HS-USB port is also capable of supporting USB operations at low speed and full speed
- The secondary controller is the full-speed USB-UICC port.

3.11.2.4 Secure digital (SD)

Secure digital (SD) products are flash-based memory cards specifically designed to meet the security, capacity, performance, and environmental requirements of popular audio and video consumer devices. Their physical form factors, pin assignments, and data transfer protocols are forward-compatible with the multimedia card (MMC), but with higher bandwidth, copyright protection (via secure version), and functional expansion through secure data input/output (SDIO) capability. SDIO enables external devices to communicate with a host like the MSM8x55 IC through its SD interface. An example MSM device SDIO application is 802.11 WLAN support.

The MSM8x55 IC provides up to three SD interfaces (Table 7-1) that provide:

Clock output up to 52 MHz

2.85 V operation on SDC4; 1.8 V operation on SDC1, SDC2, and SDC3

SDIO compatible WLAN (802.11)

Interface with SD/MMC memory cards up to 32 GB

Internal 10 k to 100 k pull-up resistors on the command and data pins

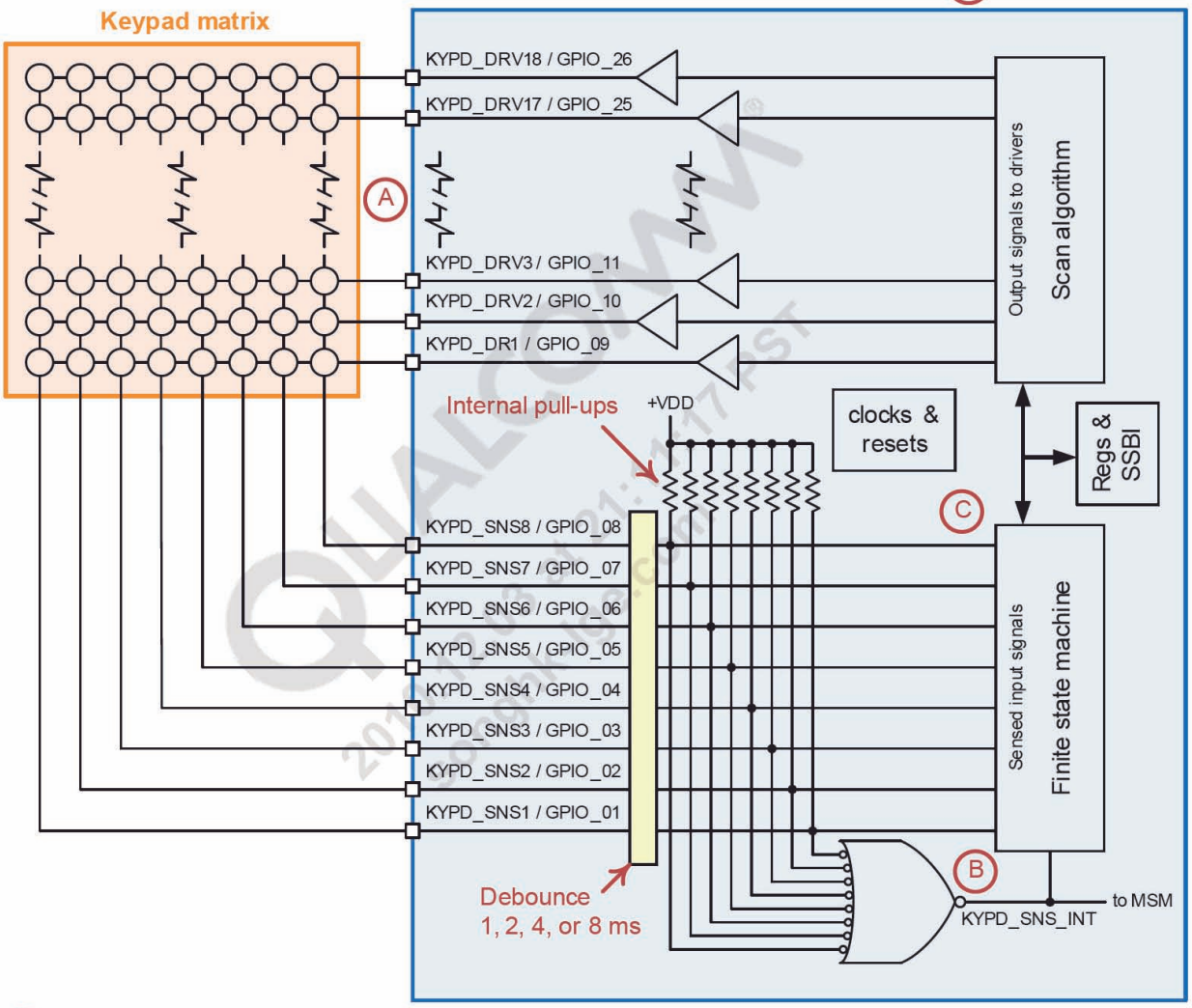
3.11.3 Keypad interface

The PMIC GPIOs can be configured to support a keypad matrix up to 18 rows by 8 columns (18 × 8). One set of pins is connected to the keypad's columns and is used for sensing; another set is connected to the keypad's rows and is used for driving. The sensed columns reveal when any keypad button is pressed, and then the rows are driven sequentially to determine precisely which keypad button was pressed.

.

1 A keypad button press is detected by ORing all column signals (KYPD_SNSx) together

- Before a keypad button is pressed, all rows are driven low. A
- When a button is pressed, its corresponding column is pulled low (since all rows are low).
- The interrupt is asserted when any keypad button, from any column, is pressed. B



2 When the interrupt signal is received, the FSM requests the next scan.

- During a scan, each row is sequentially driven low, one at a time. A
- As each row is driven low, the columns are sensed. C
- The pressed button is identified when that button's column reads low while its row is driven low.

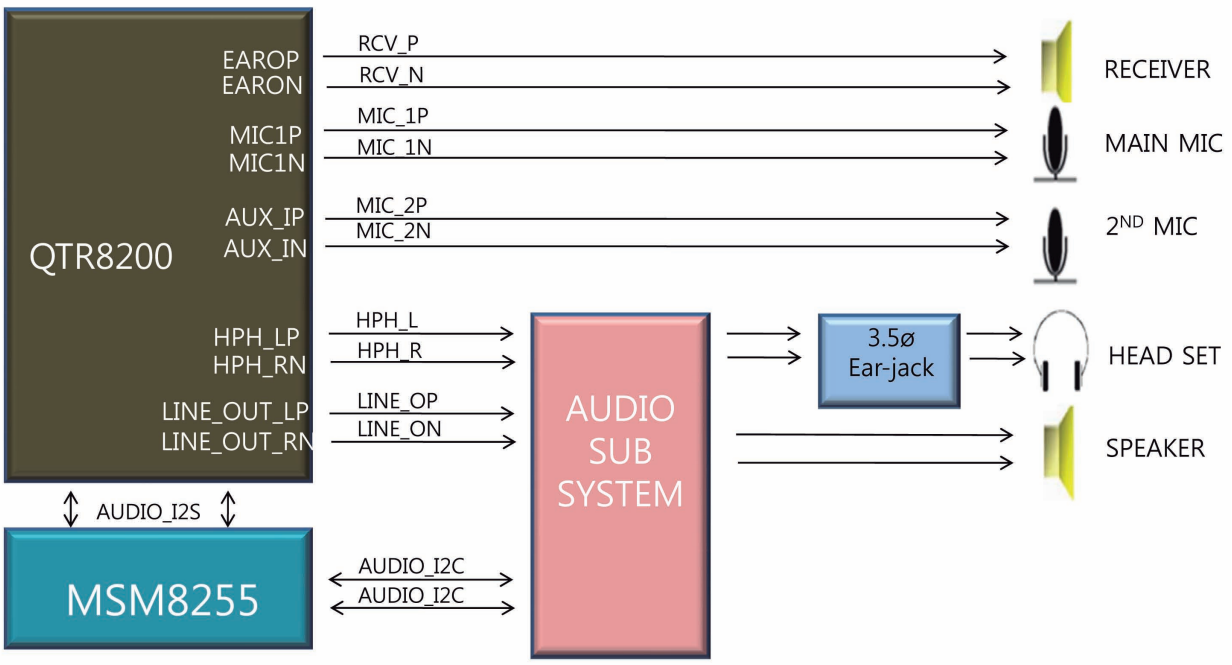
3 Other operational details

- A scan can be initiated by a key press or by request from FSM to get next keypad entry.
- Once a scan is completed the FSM compares the current data with the last data; if there was a change, the interrupt pulse is generated.
- The MSM must read the stored key presses via SSBI.
- The delay between scans is programmable (4, 8, 16, 32, 64, or 128 ms).

[Figure 3.11.3] KEY interface

3.12 Audio and sound

3.12.1 Overview of Audio path



[Figure 3.12] Block diagram of Audio & Sound path

3.12.2 Audio signal processing & interface

3.12.2.1 QTR8200 Auido intern

The QTR8200 audio codec includes multiple Tx and Rx paths to support a variety of I/Os. This wideband codec is supplemented by baseband circuits and software to support many speech formats; multimedia applications like MP3, various versions of AAC, Windows Media Audio, and AMR; PureVoice; acoustic echo cancellation; standard MIDI with 16 voices; and 128-tone CMX(text, picture, and MIDI streaming).

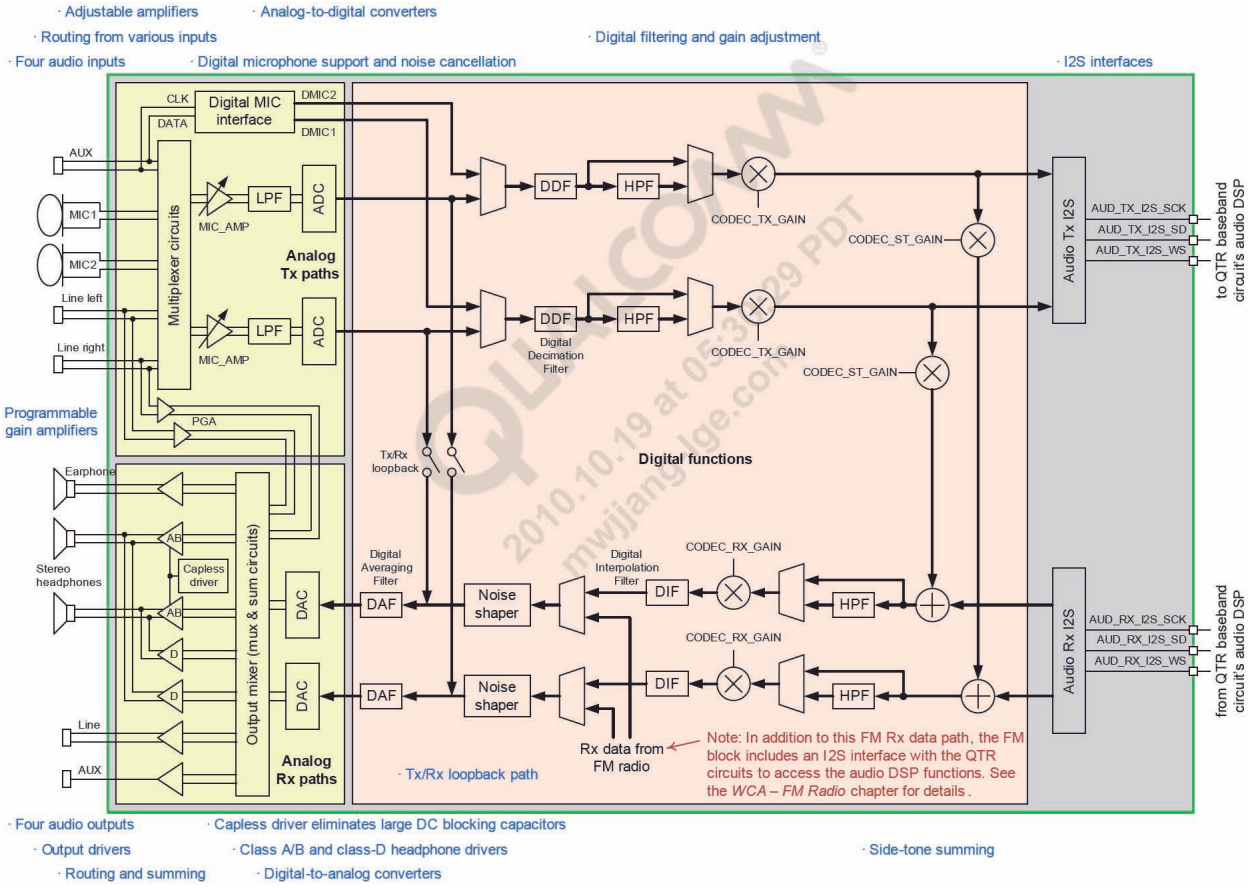
- Key audio codec features include:

➢ Tx path

- Stereo ADC – 92 dB dynamic range (typical; 48 kHz, 24 bit, 256 x FS oversampling)
- Programmable sampling rates (FS) – 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, and 48 kHz
- Independent Tx clock with programmable oversampling rate (OSR) – 64, 128, and 256
- Five analog input ports – MIC1 (differential); MIC2 (differential); stereo line inputs (both differential); and AUX (differential) Stereo digital MIC input (shares pins with AUX analog input)
- Programmable Tx analog gain settlings – 0, 4.5, and 24 dB
- Programmable gain amplifier (PGA) paths – -27.5 to +11.5 dB gain, in 3 dB steps
- Selectable PCM audio bit width – 16 or 24 bit
- Integrated digital decimation filter
- Programmable digital gain – -66 to +30 dB

➢ Rx path

- Stereo DAC – 100 dB dynamic range (typical; single-ended HPH path in capless mode)
- Programmable sampling rates (FS) – 8, 11.025, 12, 16, 22.05, 24, 32, 44.1, and 48 kHz
- Independent Rx clock with programmable over sampling rate (OSR) – 64, 128, and 256
- Four analog output ports – 32 ohm earphone (differential); stereo headphone outputs (both single-ended 16 ohm or differential 32 ohm); line outputs (two single-ended 600 ohm outputs for stereo mode or one differential 600 ohm for mono mode); and AUX (single-ended 600 ohm)
- Headphone driver options:
  - Class-AB capless (using the PMIC's negative charge pump -1.8 V supply)
  - Class-AB capacitor-coupled legacy mode
  - Class-D capacitor-coupled output (with external LC filter)
- The stereo class-D HPH option includes programmable switching frequency and over-current protection
- Selectable PCM audio bit width – 16 or 24 bit



[Figure 3.12.1] Audio codec functional block diagram

3.12.2.2 WM9093 audio interface

The WM9093 is a high performance low power audio subsystem, include headphone driver. The Class D speaker driver supports 650mW output power at 3.6V, 1% THD.

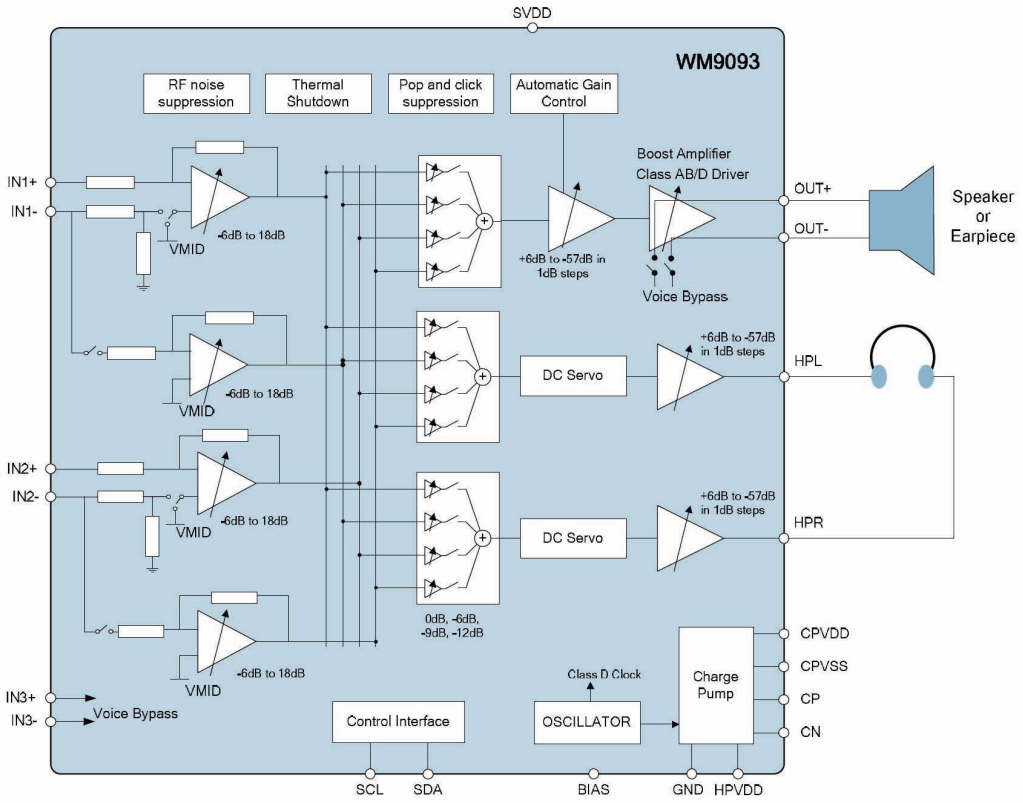
The unique dual mode charge pump architecture provides ground referenced headphone outputs removing the requirement for external coupling capacitors. Class G technology is integrated to increase the efficiency and extend playback time by optimizing the headphone driver supply voltages according to the volume control.

The flexible input configuration allows single ended or differential stereo inputs. Mixers allow highly flexible routing to the outputs. A 'Voice Bypass' path is also available for low-power voice applications.

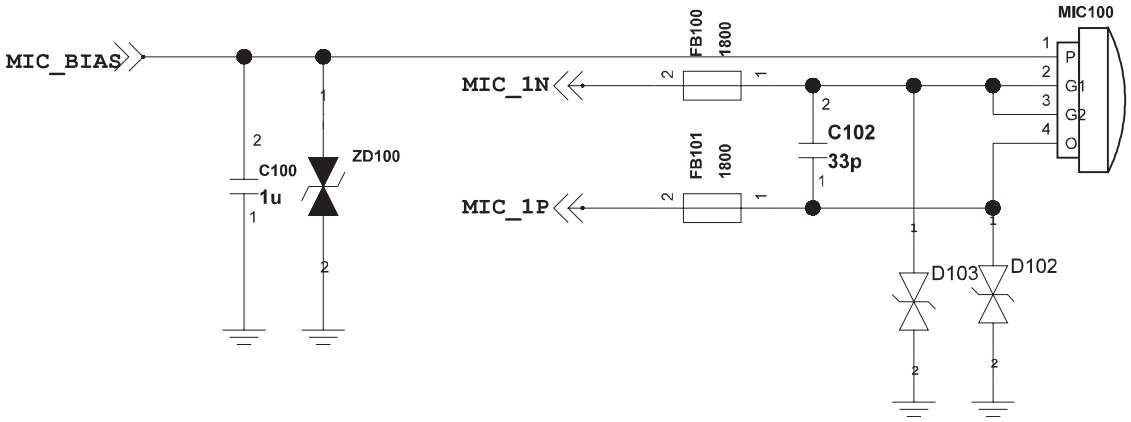
The WM9093 is controlled using a two-wire I2C interface. An integrated oscillator generates all internal clocks, removing the need to provide any external clock.

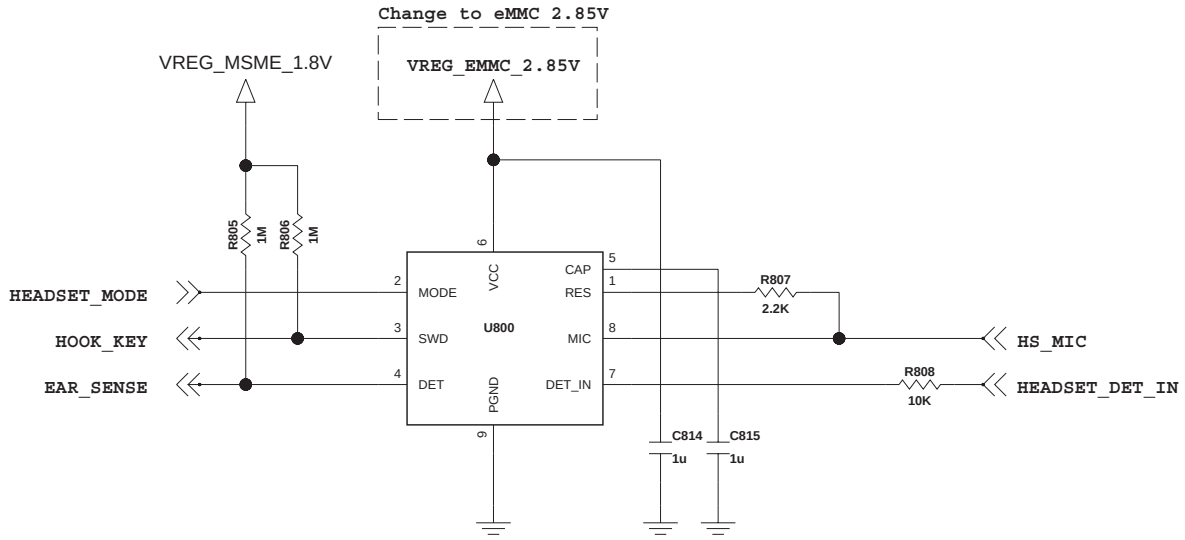
Separate mixer and volume controls are provided for each headphone and speaker driver. Automatic Gain Control limit the speaker output signal in order to prevent clipping. DC offset correction to less than 1mV guarantees a pop/click-free headphone start up.

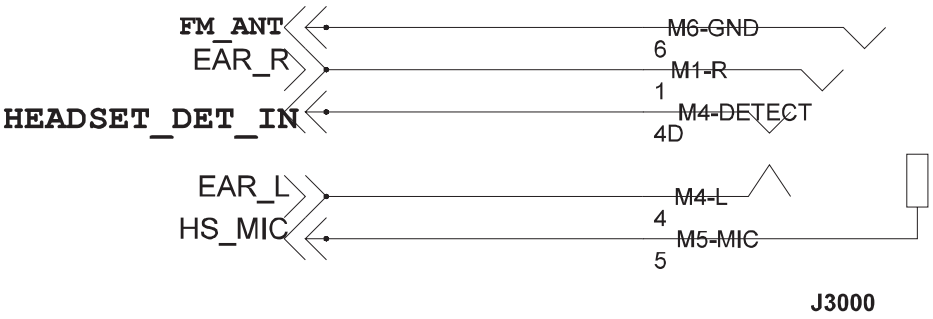
The WM9093 is available in a 2.0mm x 2.5mm 20-ump CSP package.

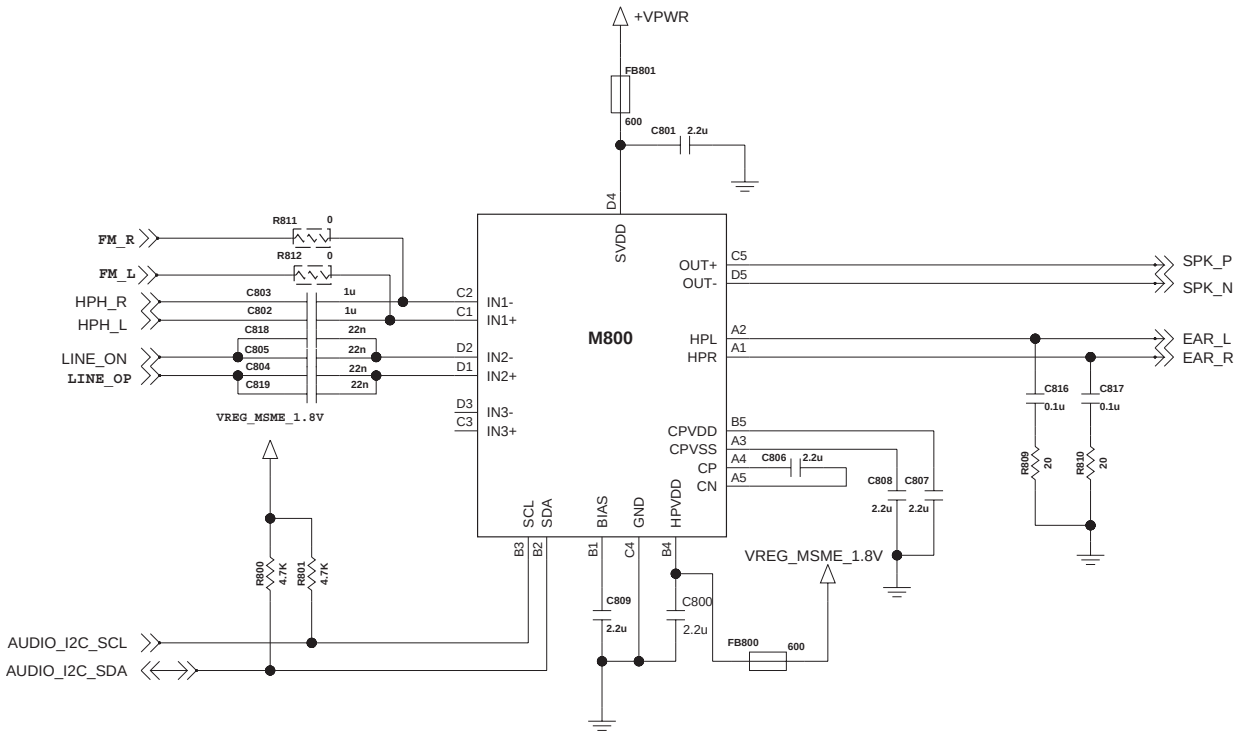


[Figure 3.12.2] Detailed diagram of WM9093 audio interface





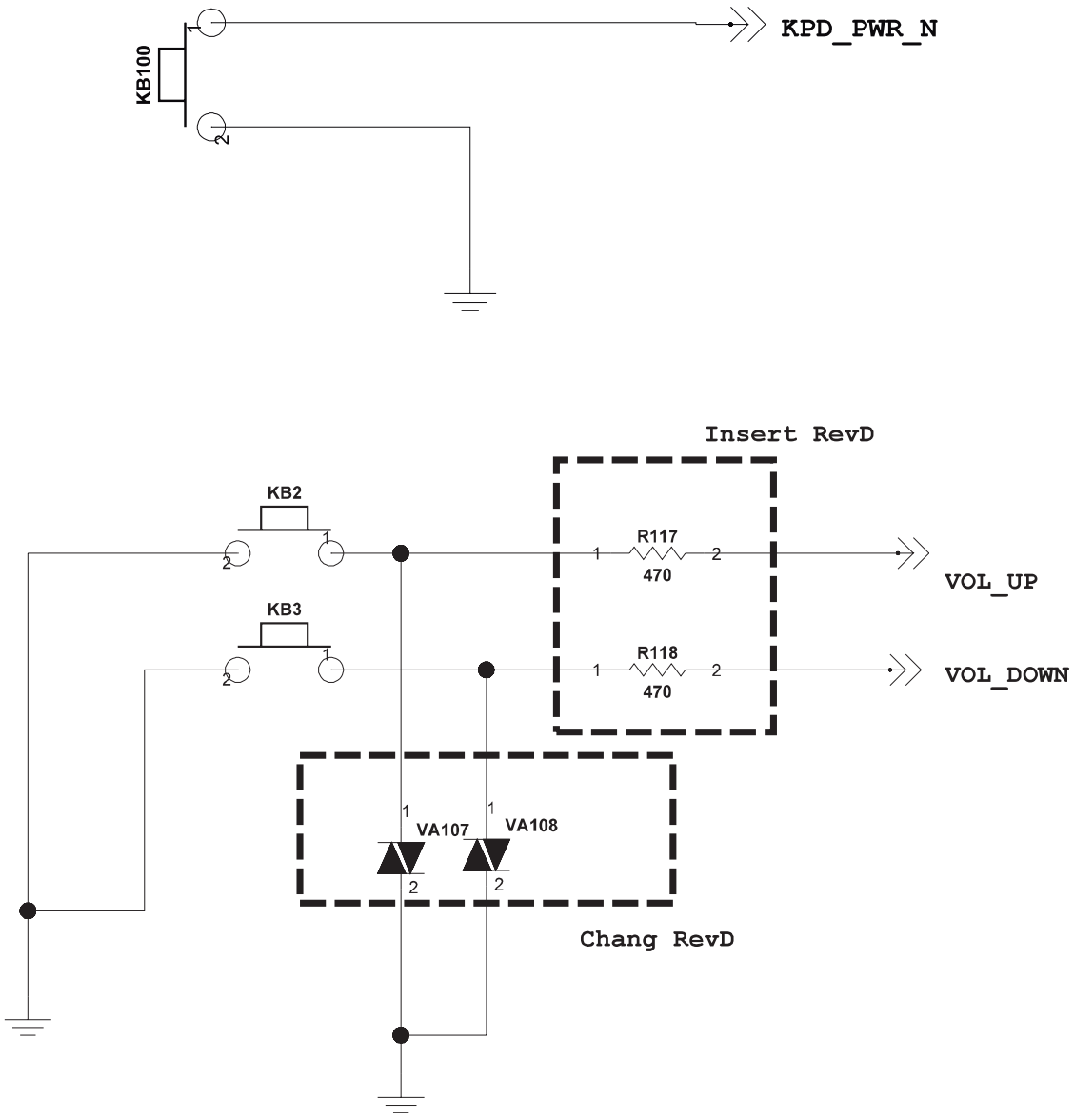


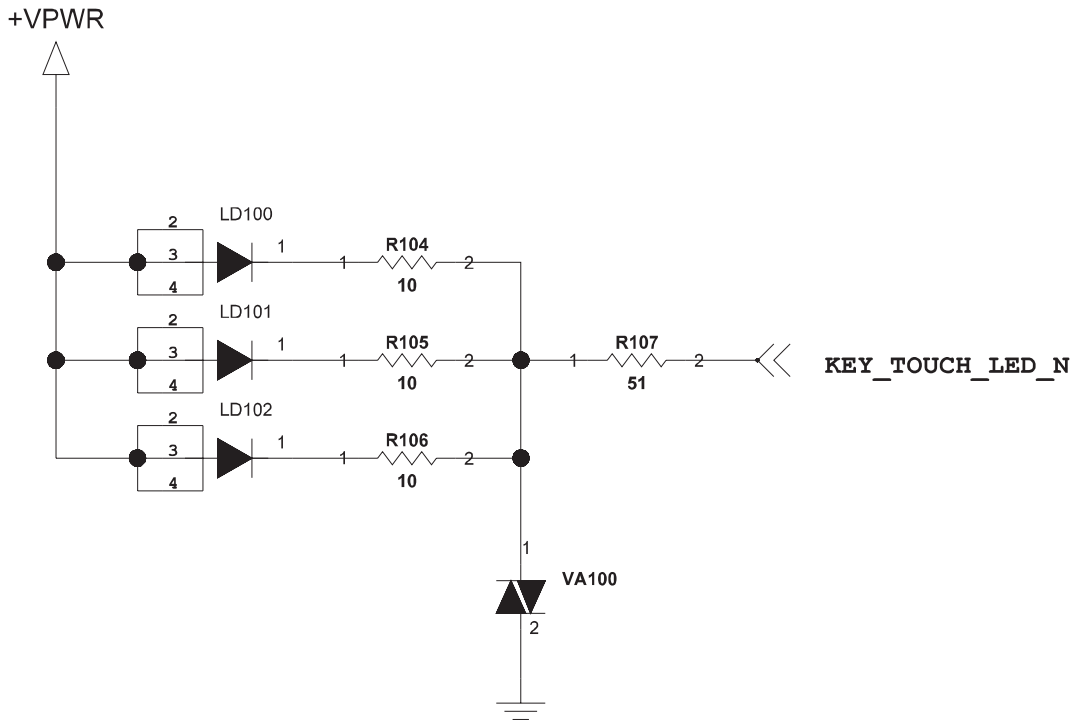


3.12.3 KEY

3.12.3.1 Side key

There are 1 Power key, 2 side keys and 3 Android keys that are controlled by MSM8255. Refer to the circuit.

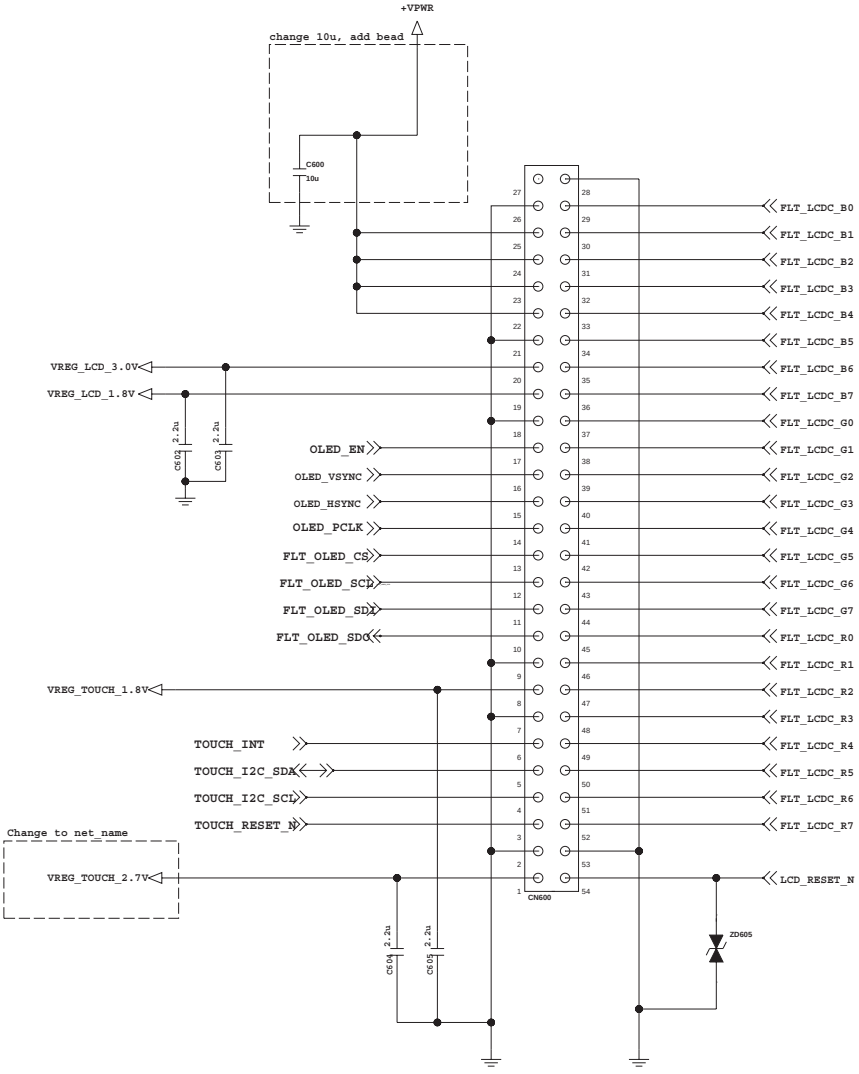




3.13 Display

LCD module is connected with 54-pin B to B connector placed on the PCB bottom.

The LCD is controlled by CPU Interface in MSM8255.



Schematic of LCD connector in Main PCB

PIN No.	FPCB SIGNAL	I/O	Function	Description
1	T_AVDD	-	Touch IC supply voltage to the analog circuit	Typical 2.7V
2	T_GND	-	Touch Ground	
3	T_RESET	IN	Touch Reset (Active Low)	
4	T_SCL	IN	Serial Clock in Touch I2C	Open drain
5	T_SDA	IN/OUT	Serial Data in Touch I2C	Open drain
6	T_CHG	OUT	State change interrupt (Active Low)	Open drain
7	T_GND	-	Touch Ground	
8	T_DVDD	-	Touch IC supply voltage to the interface pins	Typical 1.8V
9	GND	-	Ground	
10	SDO	OUT	Serial Output Data in SPI (Instruction)	
11	SDI	IN	Serial Input Data in SPI (Instruction)	
12	SCL	IN	Serial Clock in SPI	
13	CS	IN	Chip Select (Active Low)	
14	DCLK	IN	Display Clock (Rising Edge)	
15	HSYNC	IN	Line Synchronization Signal (Active Low)	
16	VSYNC	IN	Frame Synchronization Signal (Active Low)	
17	DE	IN	Data Enable (Active High)	
18	GND	-	Ground	
19	IOVCC	-	Driver IC supply voltage to the interface pins	Typical 1.8V
20	VCI	-	Driver IC supply voltage to the analog circuit	Typical 3.0V
21	GND	-	Ground	
22	VBAT	-	Power supply to Power IC	Typical 3.7V
23	VBAT			
24	VBAT			
25	VBAT			
26	GND	-	Ground	
27	VPP(1)	-	Power supply for programming an Internal NVM	Typical 7.5V

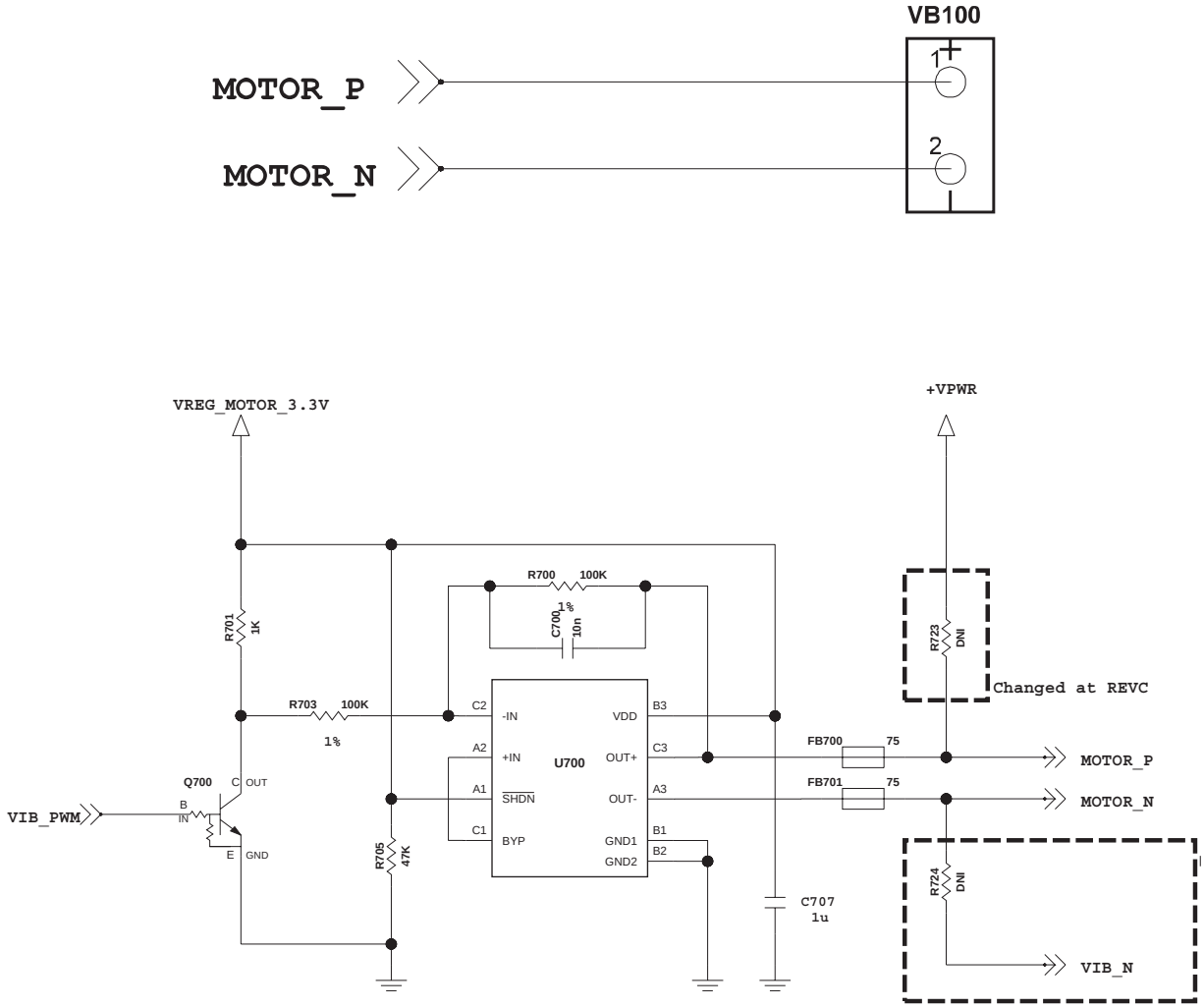
PIN No.	FPCB SIGNAL	I/O	Function	Description
28	GND	-	Ground	
29	DB0	IN	Data Bus (Display Data)	
30	DB1	IN	Data Bus (Display Data)	
31	DB2	IN	Data Bus (Display Data)	
32	DB3	IN	Data Bus (Display Data)	
33	DB4	IN	Data Bus (Display Data)	
34	DB5	IN	Data Bus (Display Data)	
35	DB6	IN	Data Bus (Display Data)	
36	DB7	IN	Data Bus (Display Data)	
37	DB8	IN	Data Bus (Display Data)	
38	DB9	IN	Data Bus (Display Data)	
39	DB10	IN	Data Bus (Display Data)	
40	DB11	IN	Data Bus (Display Data)	
41	DB12	IN	Data Bus (Display Data)	
42	DB13	IN	Data Bus (Display Data)	
43	DB14	IN	Data Bus (Display Data)	
44	DB15	IN	Data Bus (Display Data)	
45	DB16	IN	Data Bus (Display Data)	
46	DB17	IN	Data Bus (Display Data)	
47	DB18	IN	Data Bus (Display Data)	
48	DB19	IN	Data Bus (Display Data)	
49	DB20	IN	Data Bus (Display Data)	
50	DB21	IN	Data Bus (Display Data)	
51	DB22	IN	Data Bus (Display Data)	
52	DB23	IN	Data Bus (Display Data)	
53	GND	-	Ground	
54	RESX	IN	Reset (Active Low)	

[Table 3.13] Interface between LCD Module and Main PCB

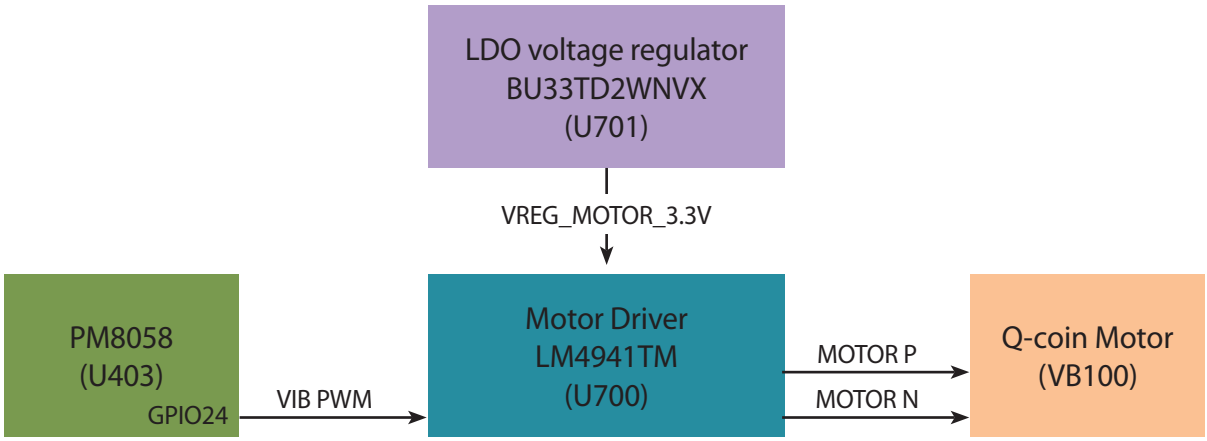
3.14 Vibrators (Q-Coin Motor)

The strength of vibration is determined by the duty cycle of PWM

U700 is Q-Coin motor driver amplifier IC.



Vibrator Circuit & Drive Amplifier circuit

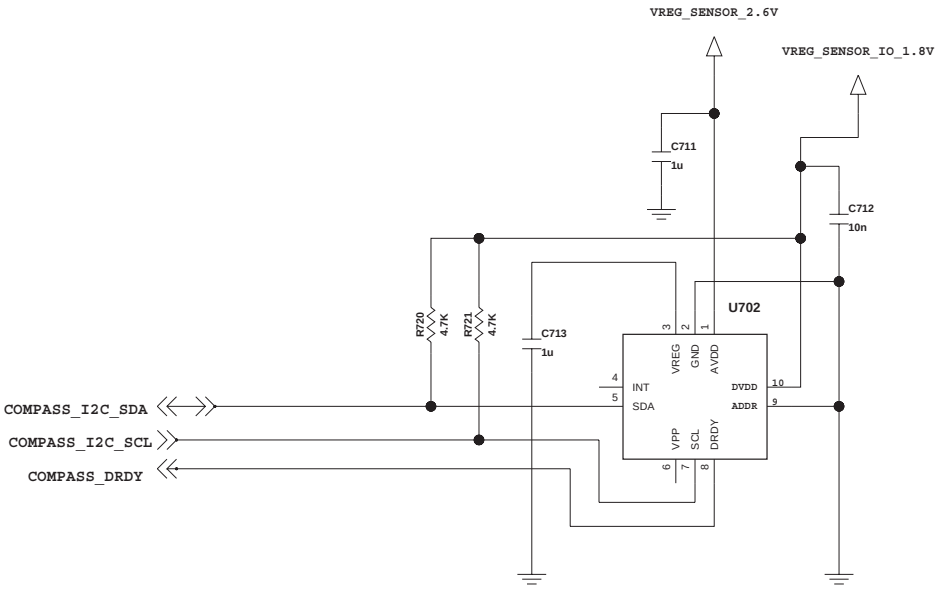


[Figure 3.14] Vibrator Block Diagram

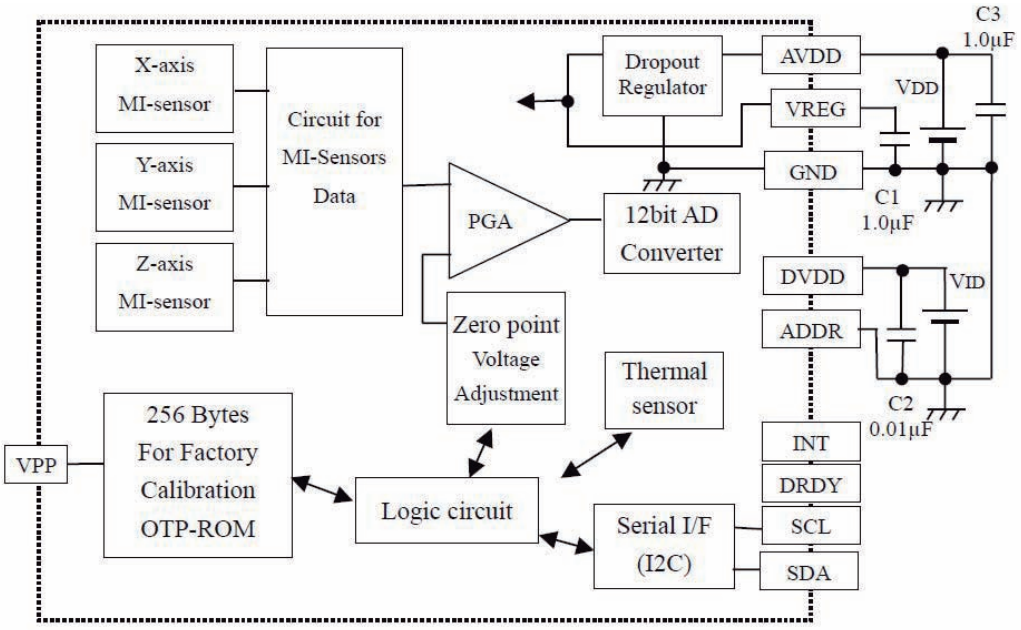
3.15 Compass Sensor

If a customer buy the application SW, the sensor support a electric compass function

U702 : AMI306 IC used I2C interface to MSM8255



Compass Sensor Schematic

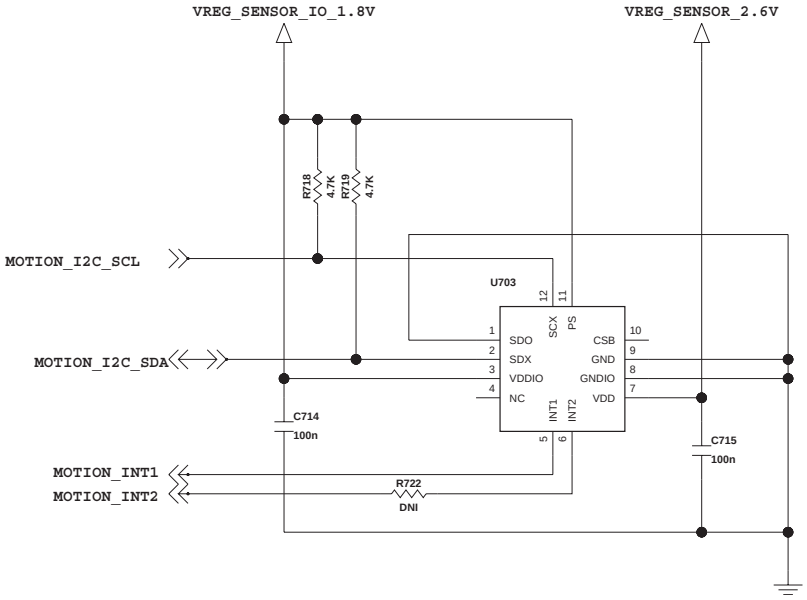


[Figure 3.15] Compass Sensor Block Diagram

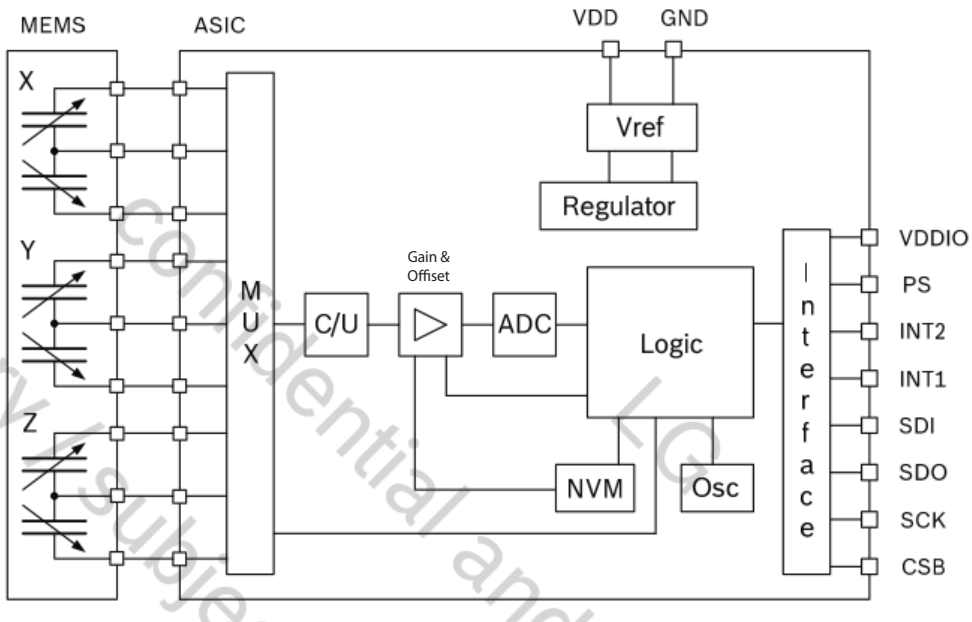
3.16 Motion Sensor

According to tilt the cell phone, the screen is had rotated automatically.

U600 : BMA250 IC used I2C interface to MSM8255



Motion Sensor Schematic



[Figure 3.16] Motion Sensor Block Diagram

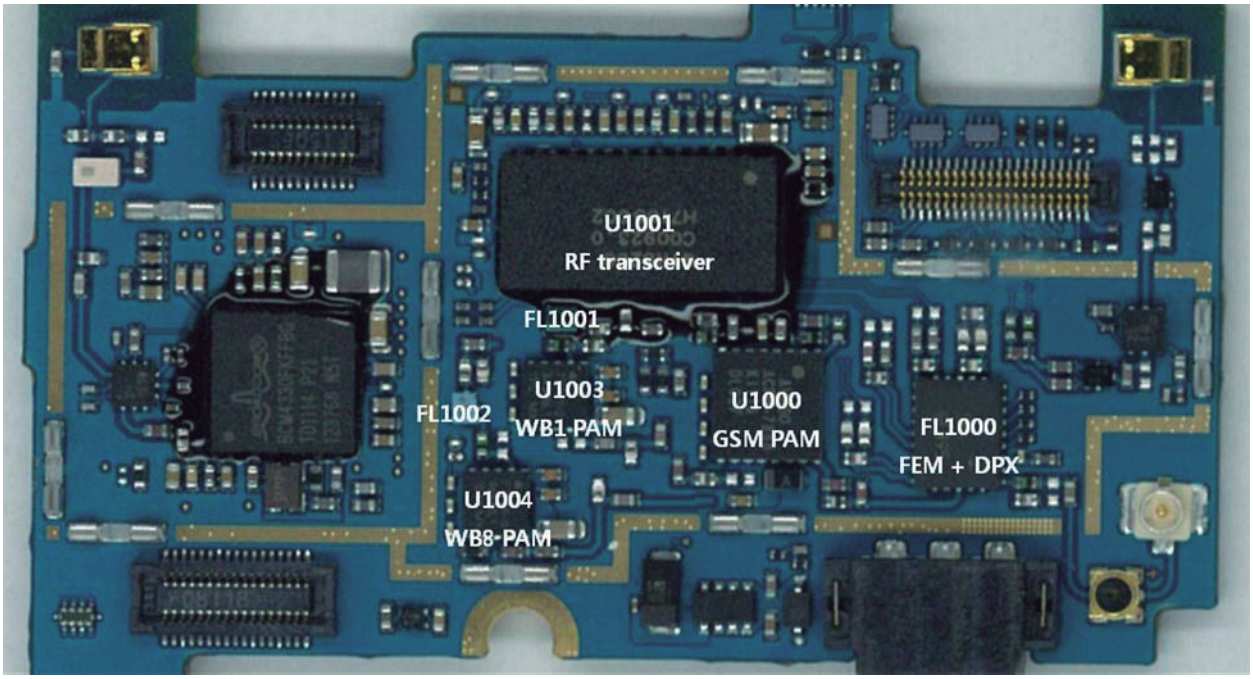
3.17 Main Features

3.17.1 LG-E730 Main Features

- DOP Type design
- UMTS 2100 + UMTS900+ GSM 900 + DCS 1800 + PCS 1900 + GSM850 based GSM/GPRS/EDGE/UMTS(WCDMA, HSDPA, HSUPA)
- HSDPA 7.2Mbps, HSUPA 2.9Mbps
- Main LCD(WVGA)
  AMOLED Main LCD(3.8", 480X800)
- Capacitive/Electrostatic Touch Window
- 5M AF Camera, 1.3 M secondary camera
- 3.5Phi Stereo Headset & Speaker phone
- Mobile XMF –Mobile DLS / Scaleable Polyphony
- MP3/AMR/AAC/AAC/WAV/WMA decoder and play
- MPEG4 encoder/decoder and play/save
- JPEG en/decoder
- Supports Bluetooth and HS-USB
- Supports WLAN(802.11b, 802.11g, 802.11n)
- Supports FM Radio
- 1500 mAh (Li-Ion)

4. TROUBLE SHOOTING

4.1 RF Component

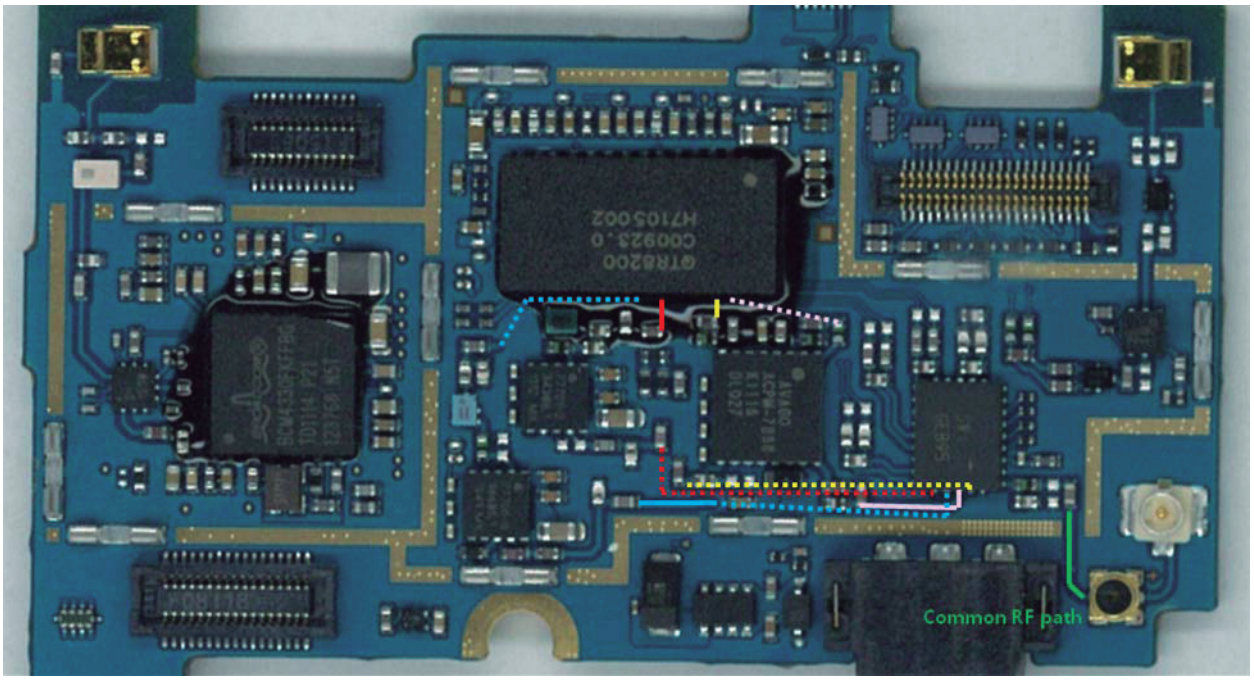


RF component (WCDMA / GSM)

Reference	Description	Reference	Description
U1000	GSM PAM	FL1000	FEM + dual duplexer
U1001	QTR8255(Transceiver)	FL1001	WCDMA (I) TX SAW Filter
U1003	WCDMA band1 PAM	FL1002	WCDMA (VIII) TX SAW Filter
U1004	WCDMA band8 PAM		

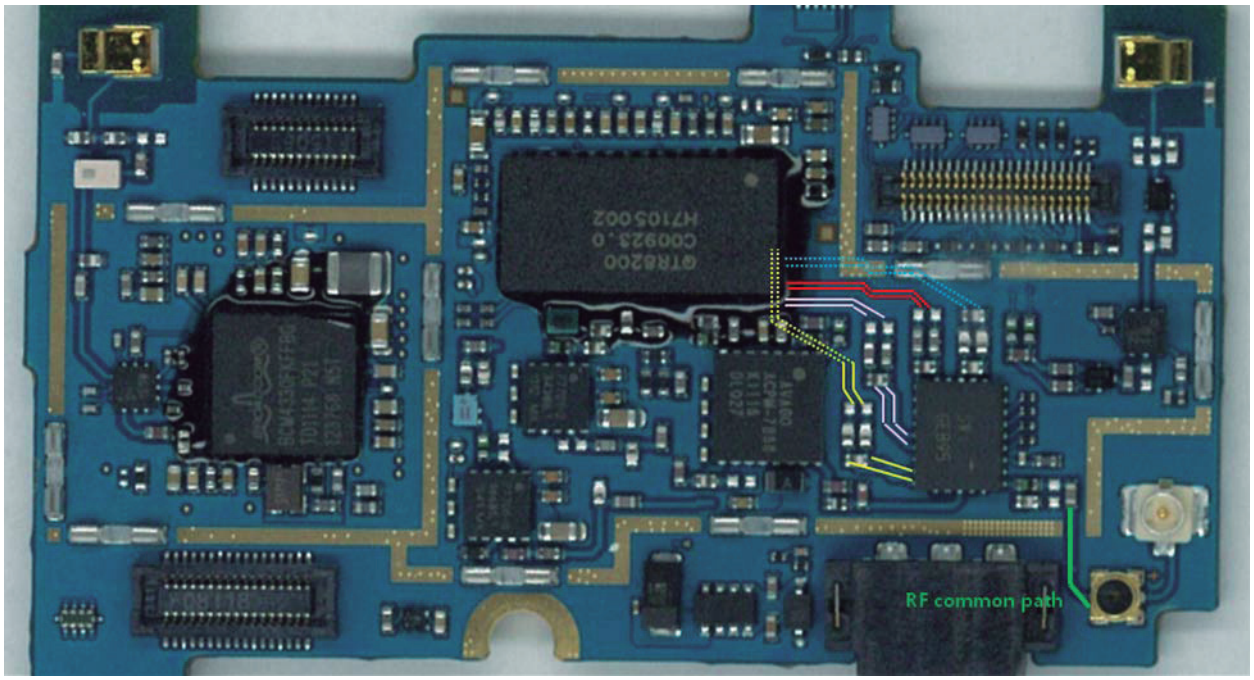
4.2 SIGNAL PATH

WCDMA / GSM Tx PATH



WCDMA 2100 TX PATH,
WCDMA 900 TX PATH
GSM Low Band Tx PATH,
GSM Hign Band Tx PATH

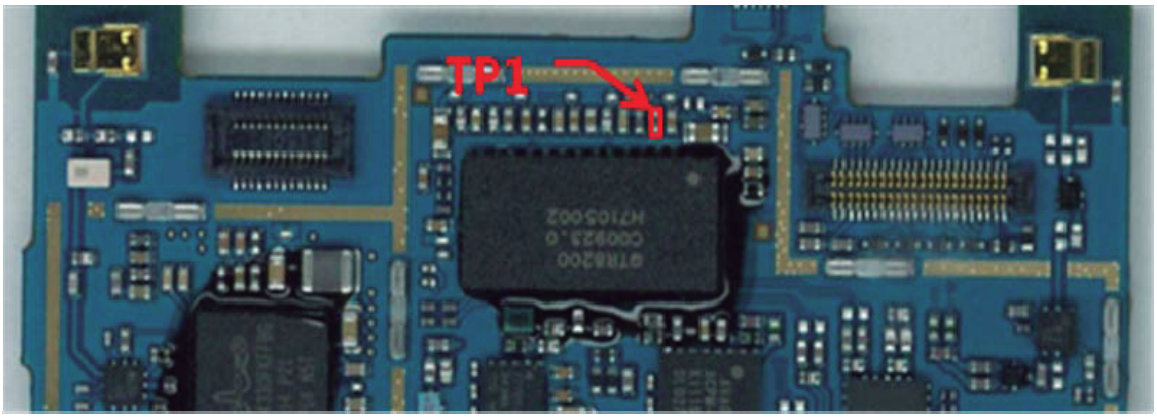
WCDMA / GSM Rx PATH

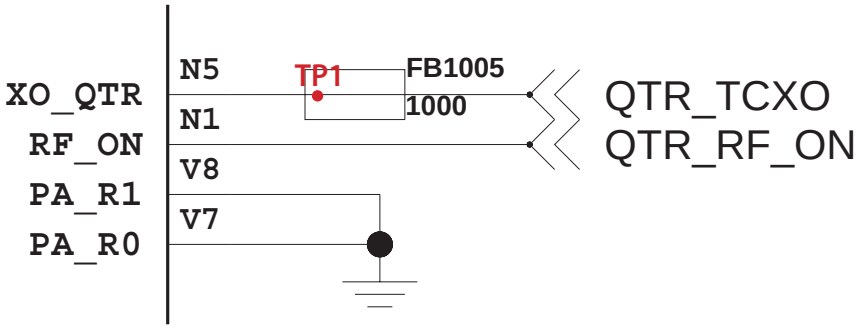


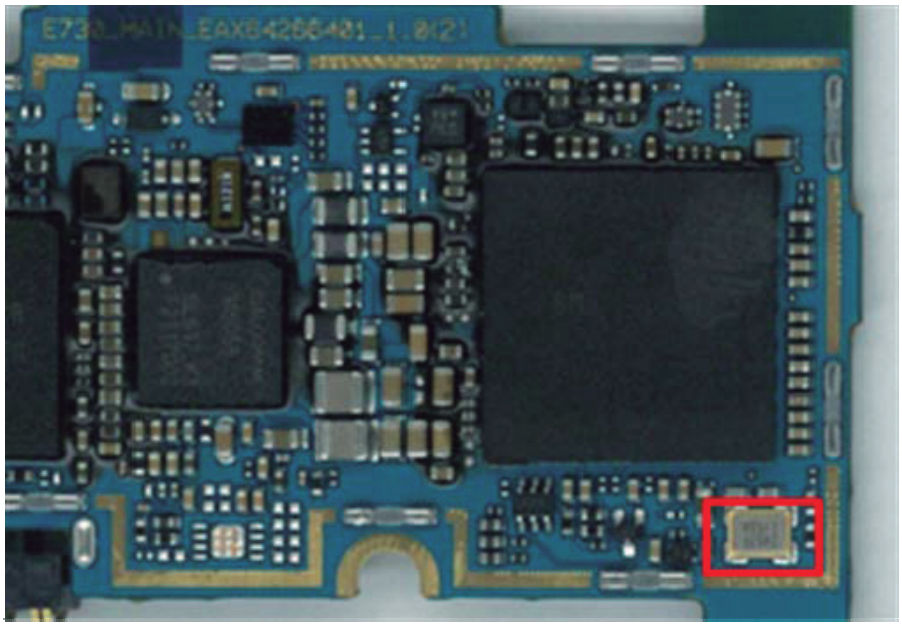
WCDMA 2100 RX PATH,
WCDMA 900/EGSM RX PATH,
GSM High Band Rx PATH,
GSM 850 Band Rx PATH

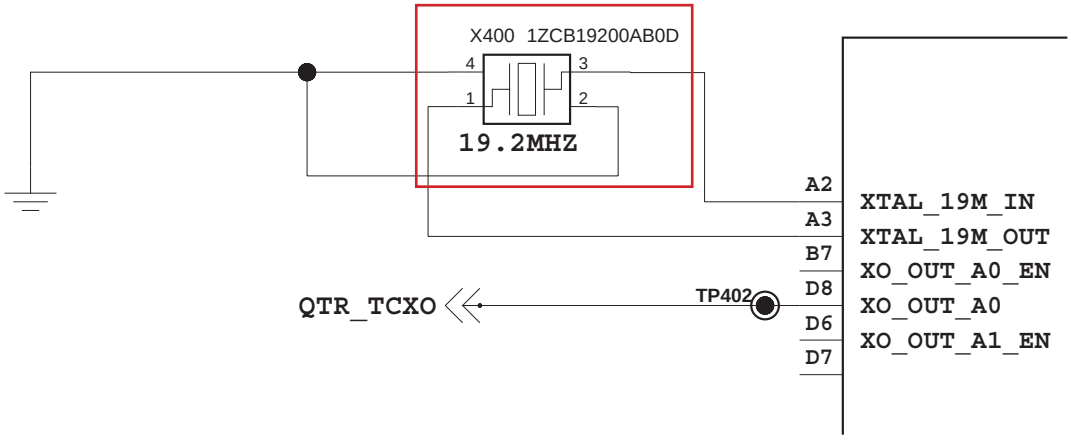
4.3 Checking XO Block

The output frequency (19.2MHz) of XO (X400) is used as the reference one of QTR8200

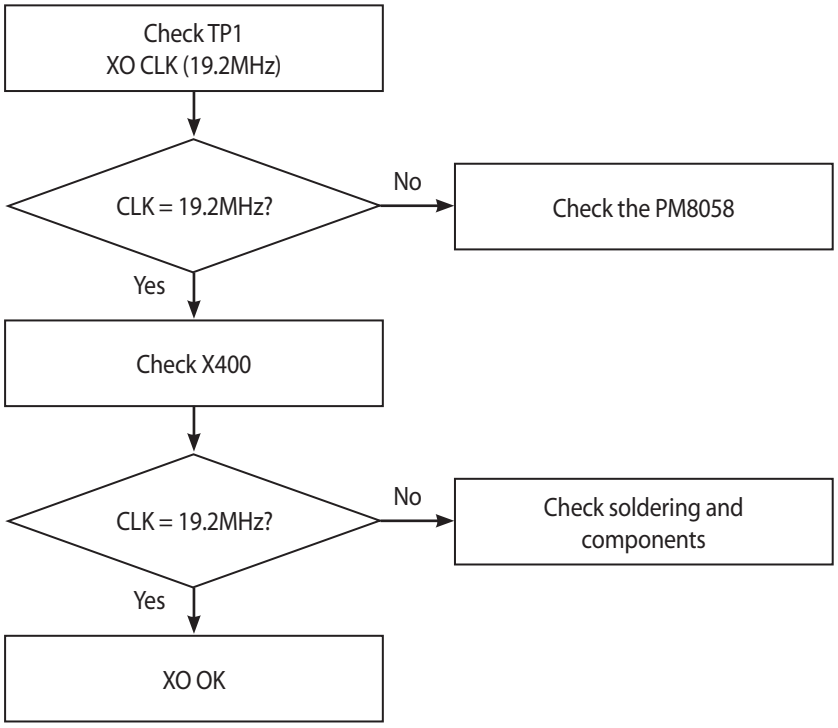




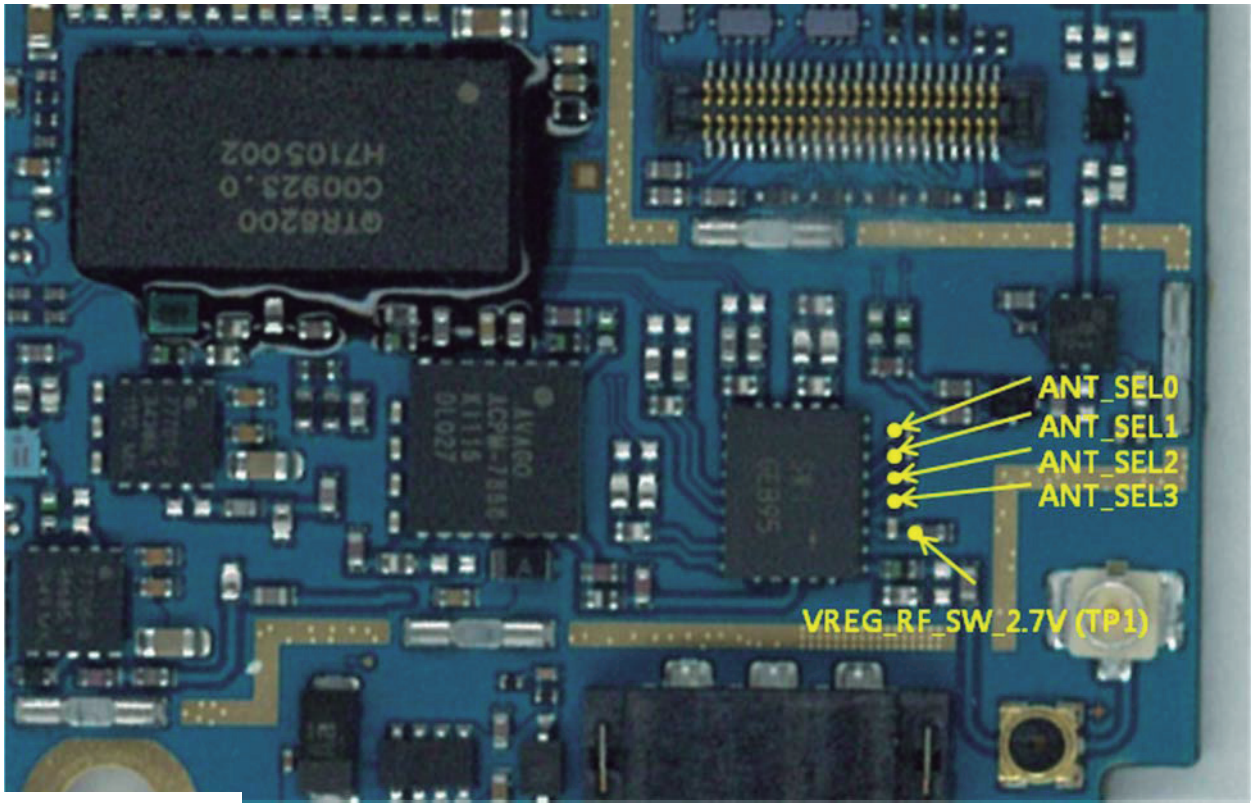




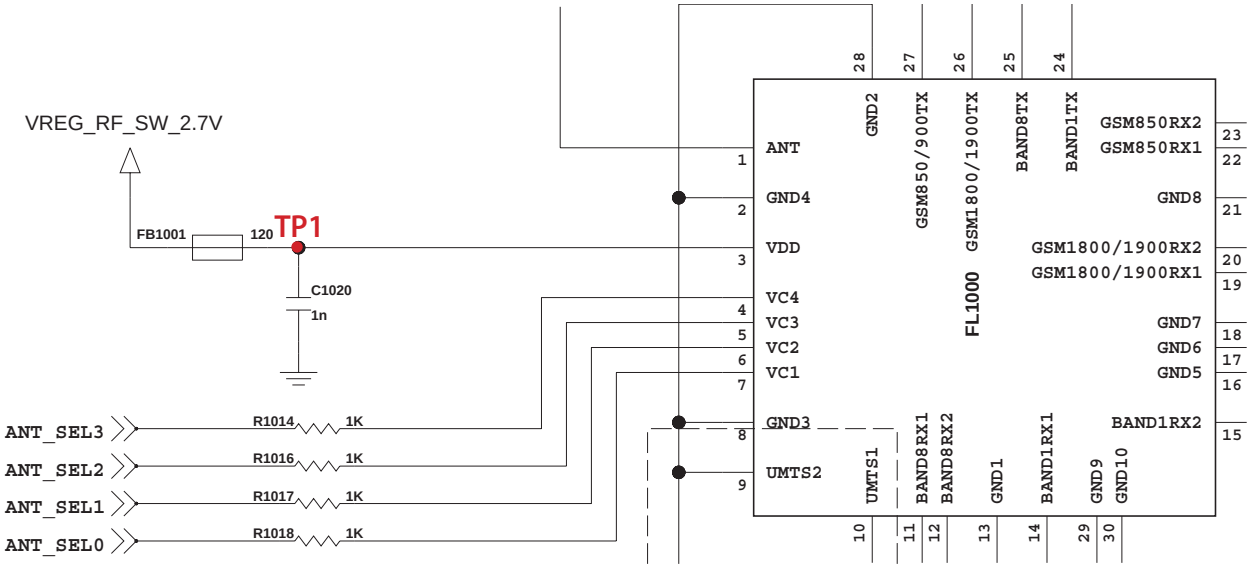
<Test Point (XO Block)>



4.4 Checking Dual Rx module (FEM + Dual Duplexer) Block



<Test Point (GSM Rx Dual Module)>

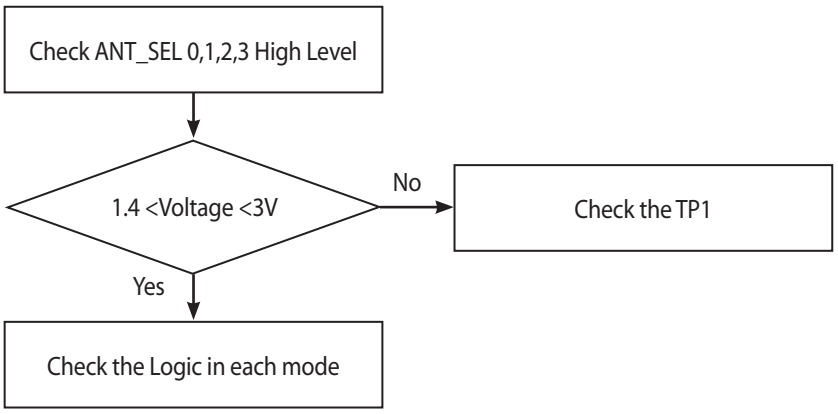


CONTROL LOGIC

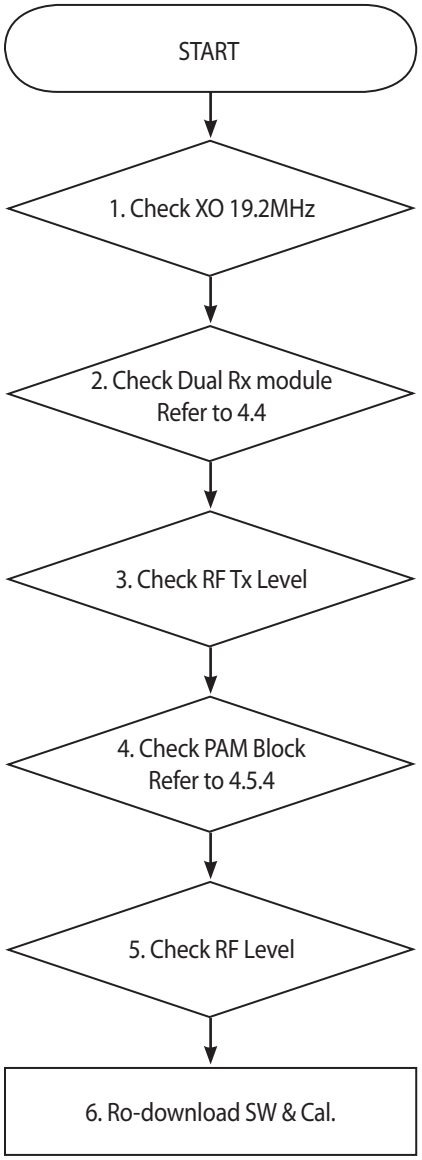
Mode	V1	V2	V3	V4
GSM850/900 Tx	1	0	0	1
GSM1800/1900 Tx	0	1	0	0
GSM850 Rx	0	0	1	0
GSM1800 Rx	1	0	1	0
GSM1900 Rx	1	1	1	0
UMTS Band1	1	1	0	0
UMTS Band8	1	0	0	0
UMTS1	1	0	1	1
UMTS2	1	1	1	1

SUPPLY VOLTAGE

	Min	Max
Vdd	2.50	3.00
H	1.4	Vdd
L	0	0.3



4.5 Checking WCDMA Block



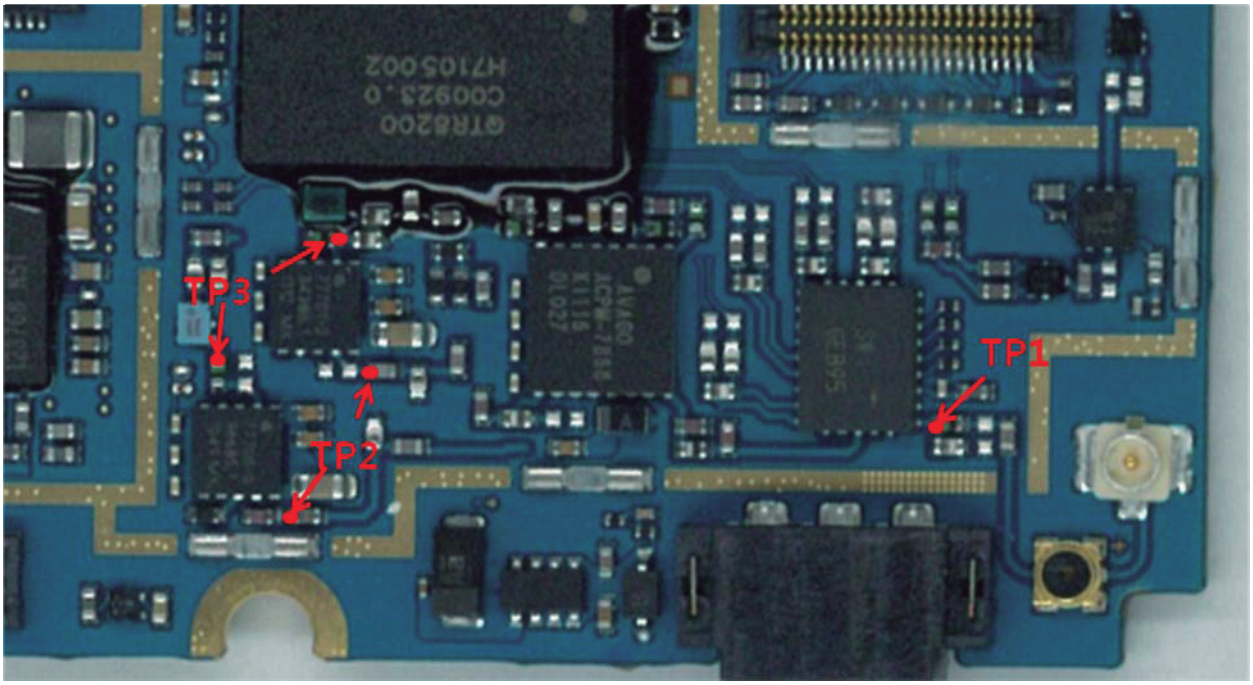
4.5.1Checking XO Block

Refer to 4.3

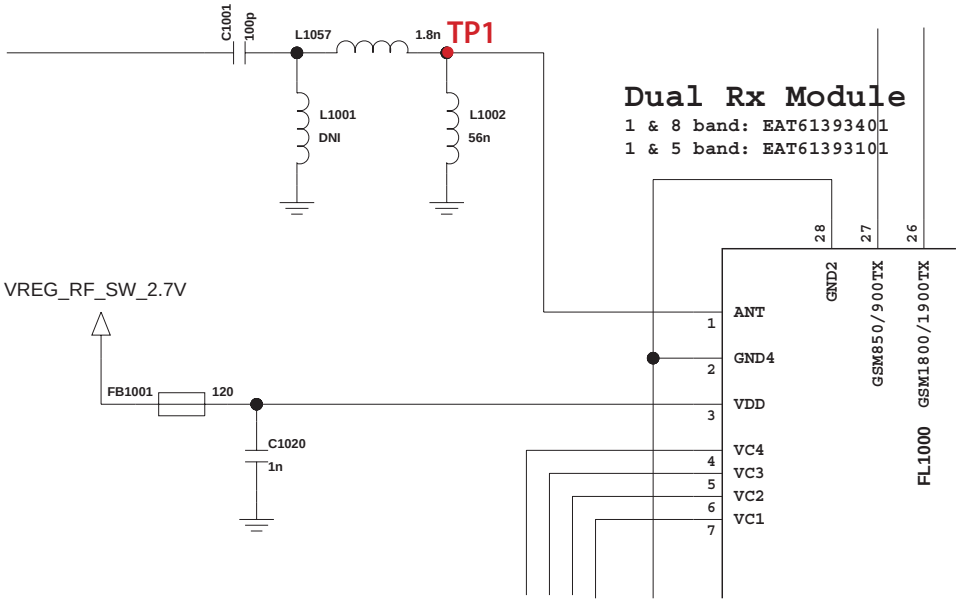
4.5.2. Checking FEM Block

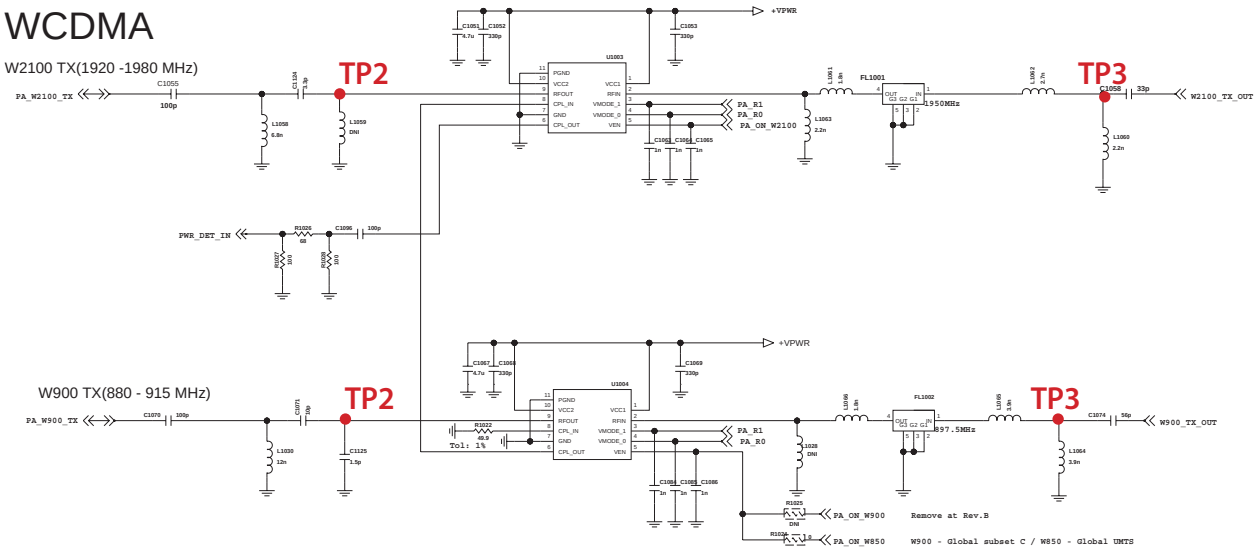
Refer to 4.4

4.5.3. Checking RF TX Level

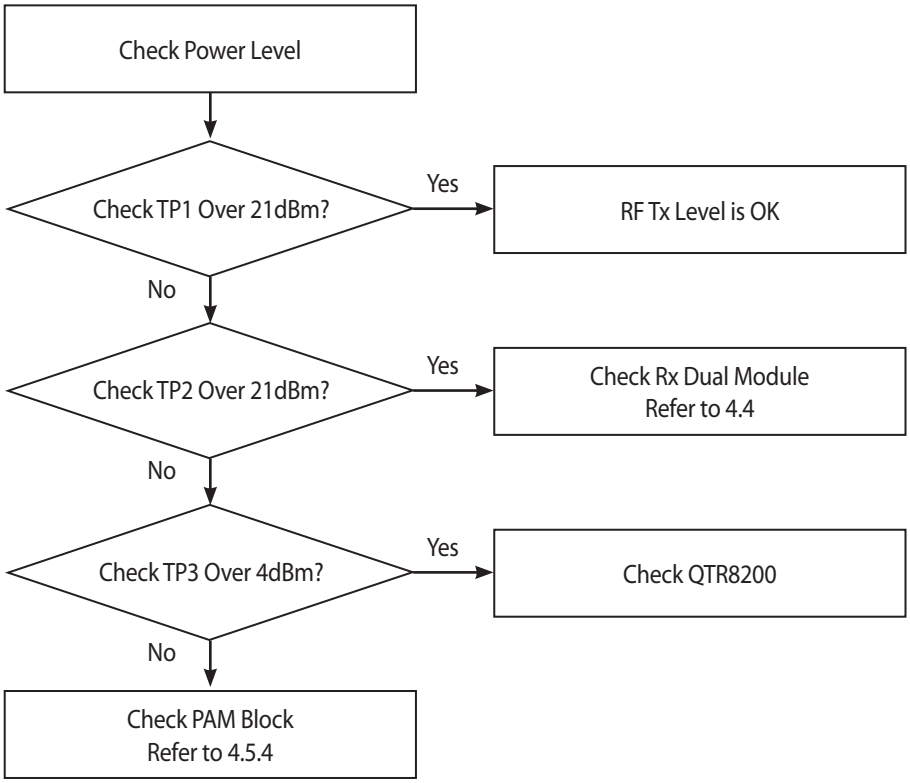


<Test Point (WCDMA RF TX Level)>





For testing, Max power output is needed.



QTR8200 Maximum output Power = 4 dBm
QTR8200 minimum output Power = -76 dBm

4.5.4 Checking WCDMA PAM Block

PAM control signal

PA_ON_W2100 (C1065), PA_ON_W850(C1086) : PAM Enable

PA_R0, PA_R1: PAM Gain Control

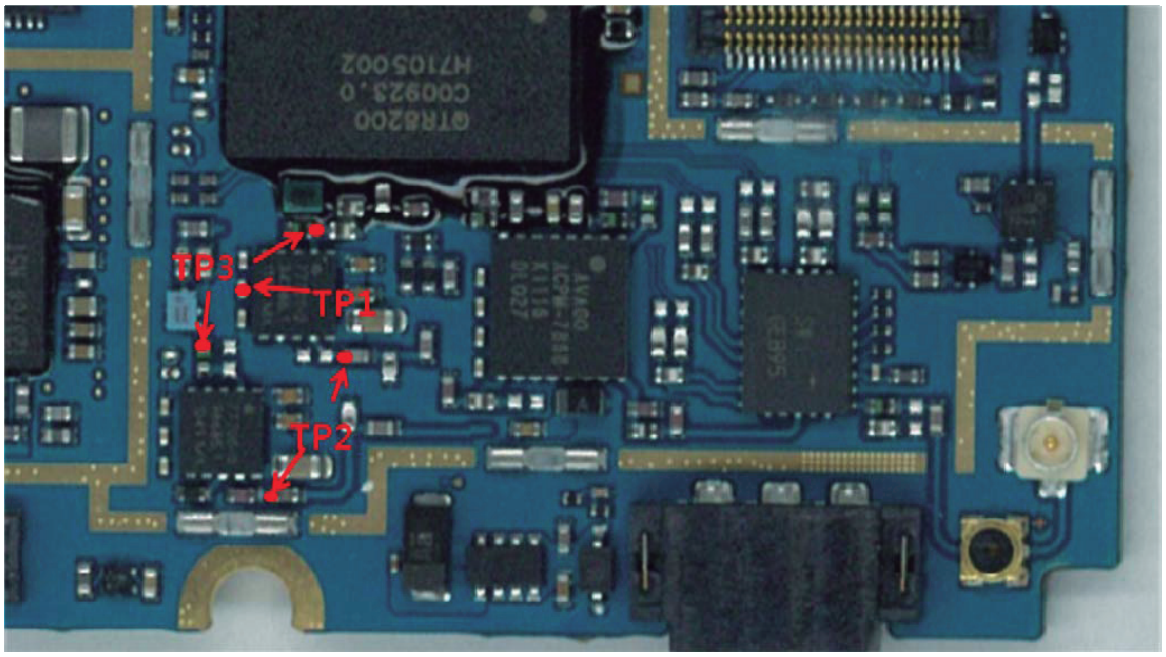
PA_ON must be HIGH (over 2.6V)

PAM IN/OUT Signal

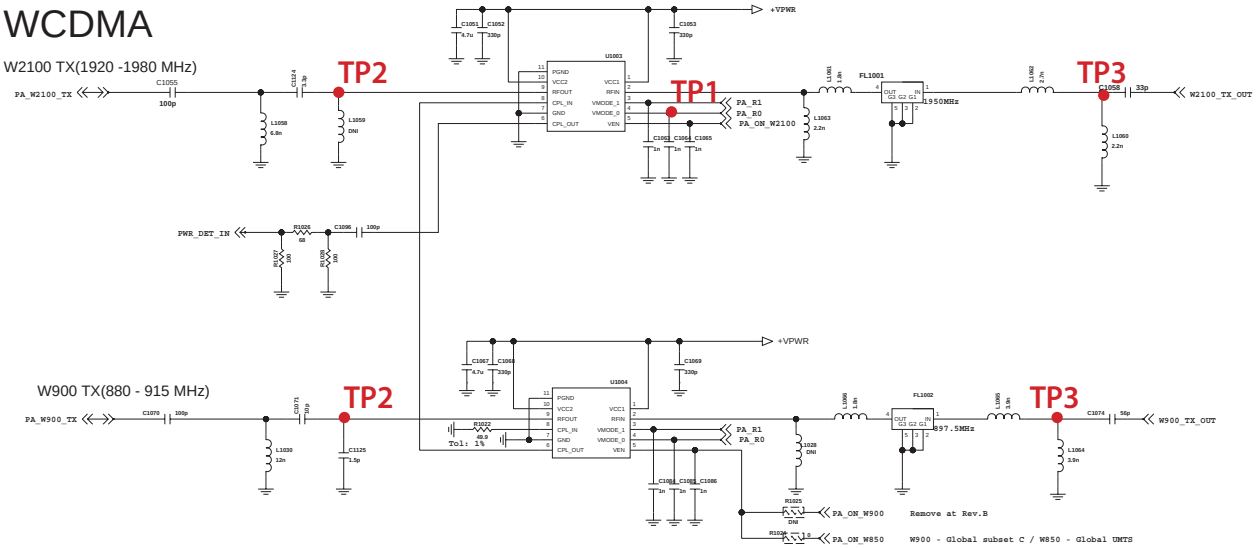
When PAM is under the operation of high power mode (PA_R0(C1084):Low),

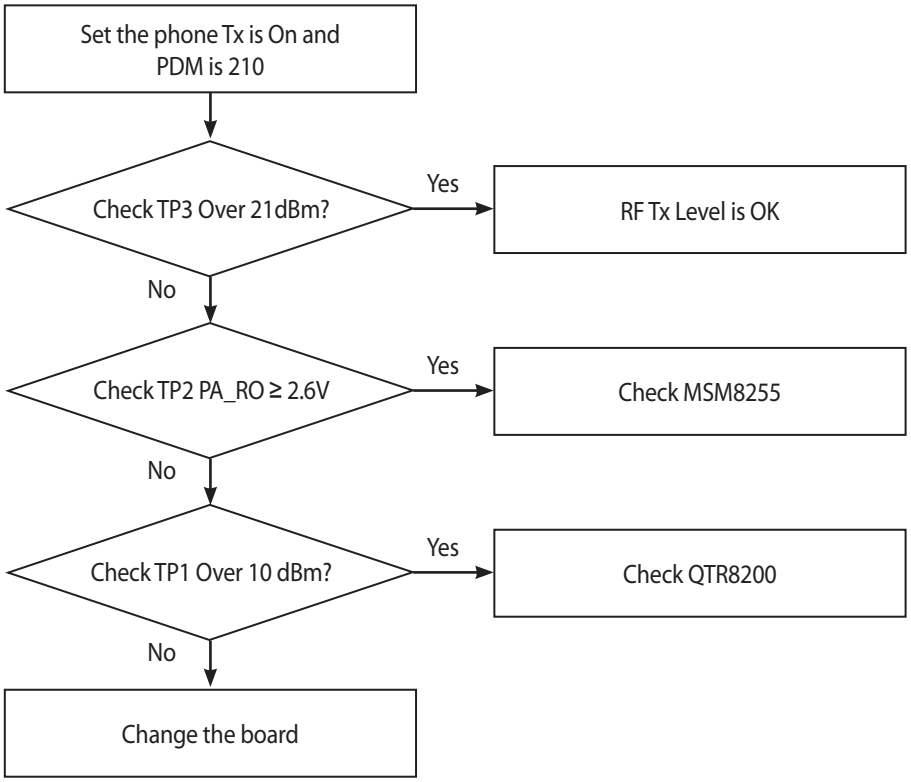
PAM OUT power must be over 21 dBm

PAM IN power must be under 10 dBm

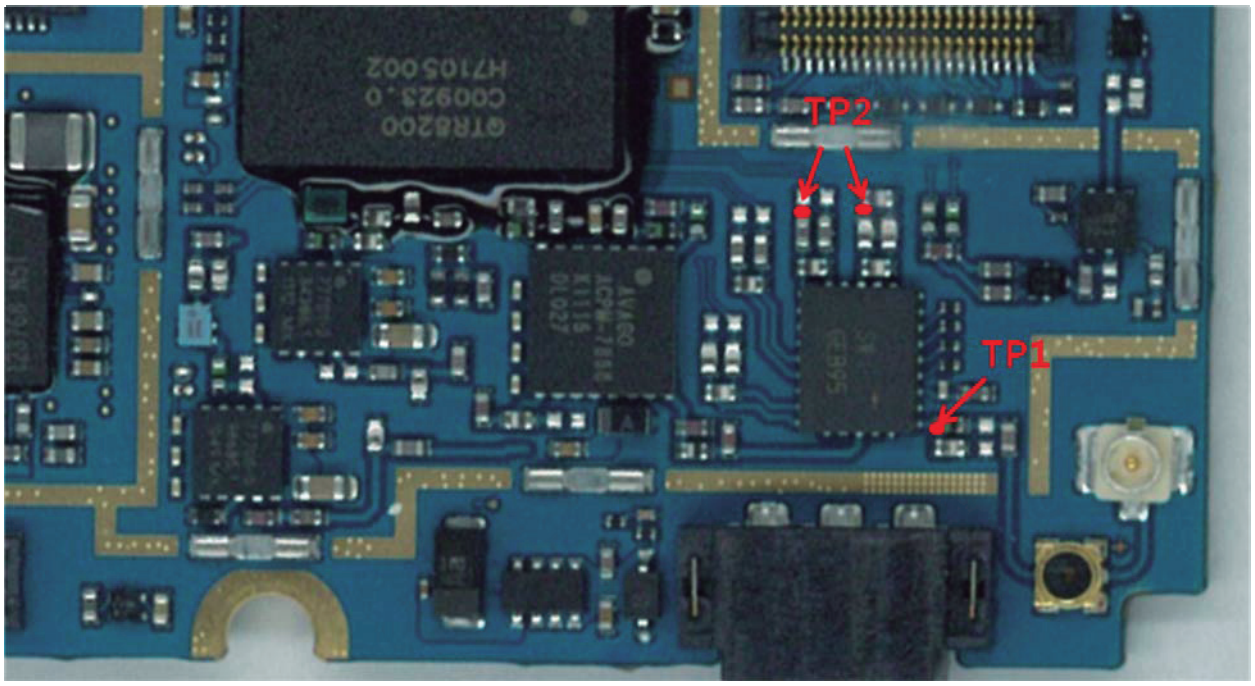


<Test Point (WCDMA PAM block)>

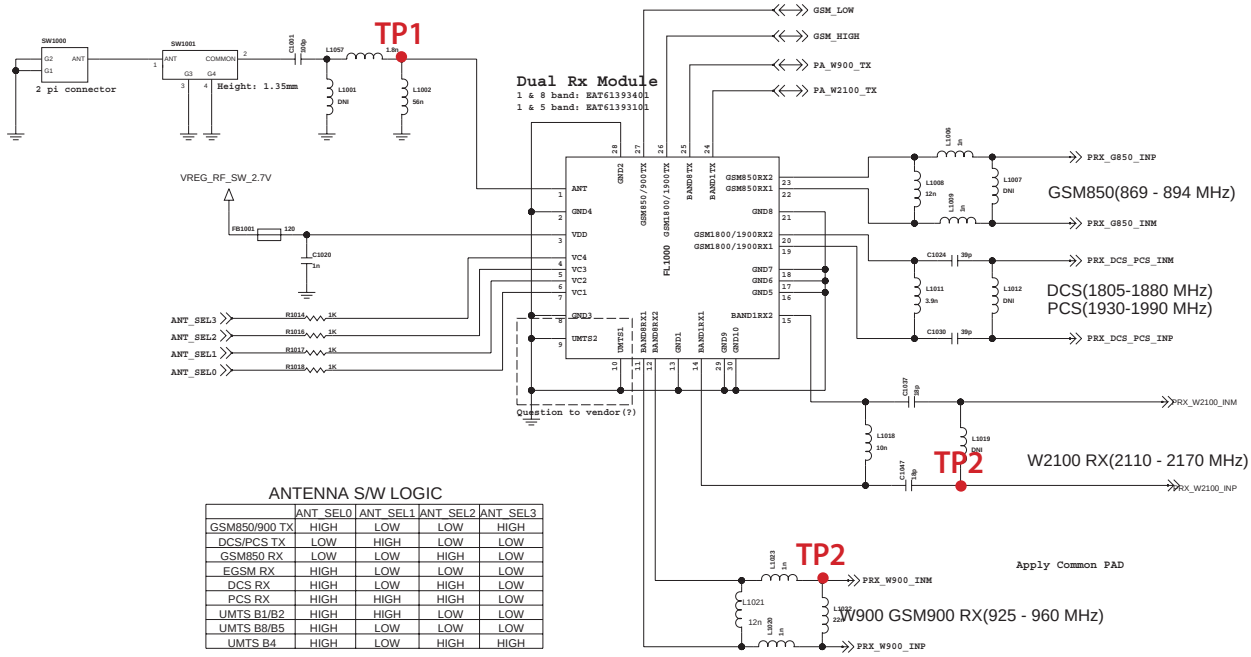




4.5.5 Checking RF Rx Level

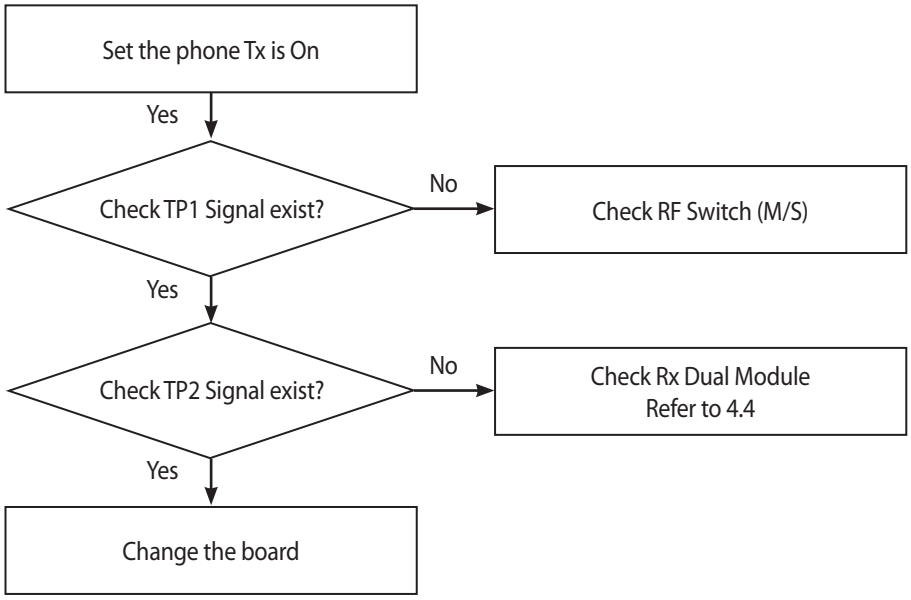


<Test Point (WCDMA RF Rx Level)>

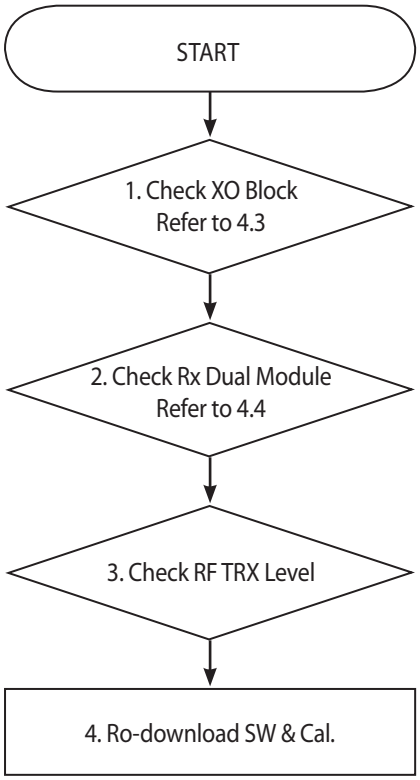


ANTENNA S/W LOGIC

	ANT_SEL0	ANT_SEL1	ANT_SEL2	ANT_SEL3
GSM850/900 TX	HIGH	LOW	LOW	HIGH
DCS/PCS TX	LOW	HIGH	LOW	LOW
GSM850 RX	LOW	LOW	HIGH	LOW
EGSM RX	HIGH	LOW	LOW	LOW
DCS RX	HIGH	LOW	HIGH	LOW
PCS RX	HIGH	HIGH	HIGH	LOW
UMTS B1/B2	HIGH	HIGH	LOW	LOW
UMTS B8/B5	HIGH	LOW	LOW	LOW
UMTS B4	HIGH	LOW	HIGH	HIGH



4.6 Checking GSM Block



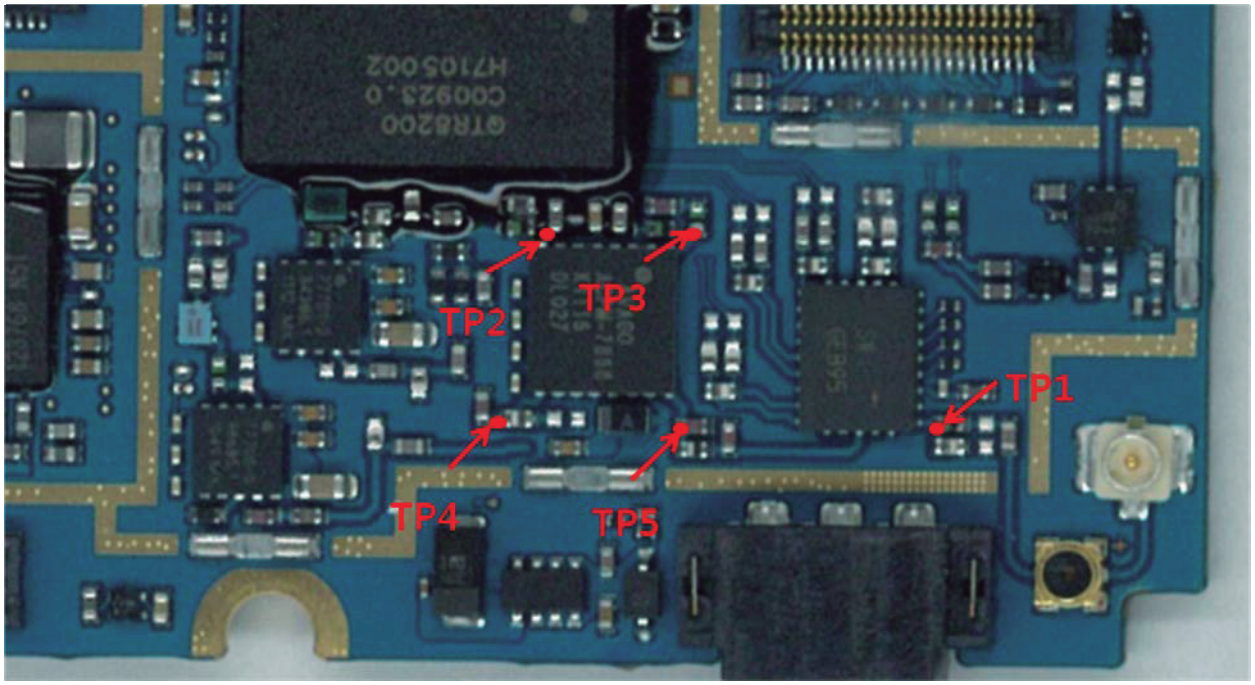
4.6.1 Checking XO Block

Refer to 4.3

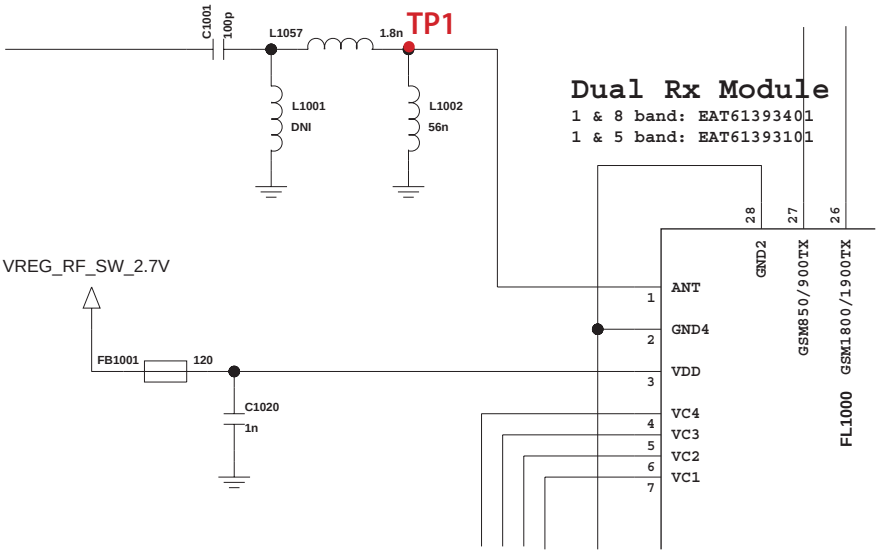
4.6.2 Checking Rx dual modul Block

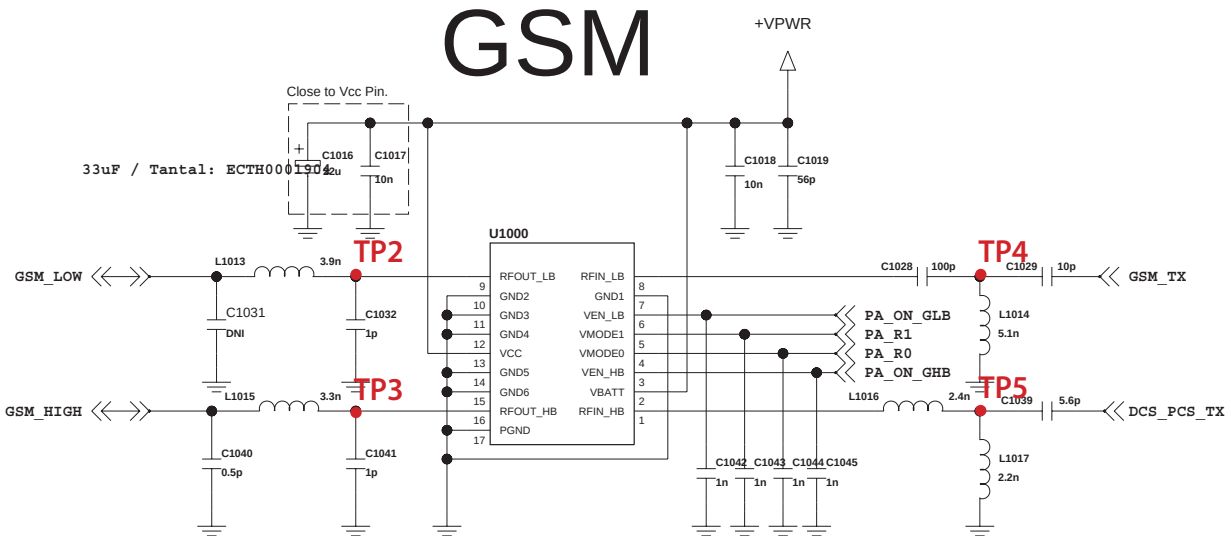
Refer to 4.4

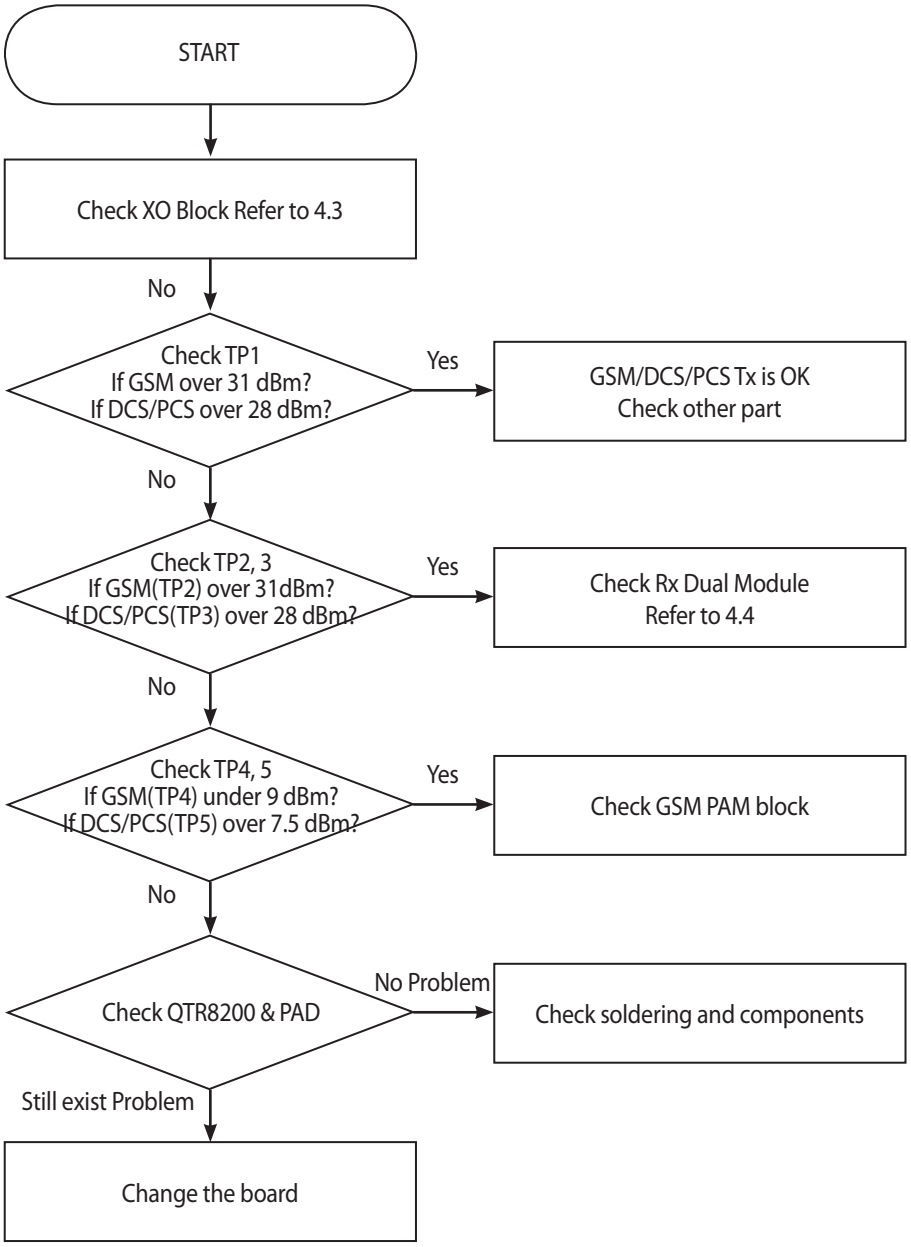
4.6.3 Checking RF TX level



<Test Point (GSM RF Tx Level)>







4.6.4 Checking GSM PAM block

PAM control signal

PA_ON_W2100 (C1065), PA_ON_W850(C1086) : PAM Enable

PA_R0, PA_R1: PAM Gain Control

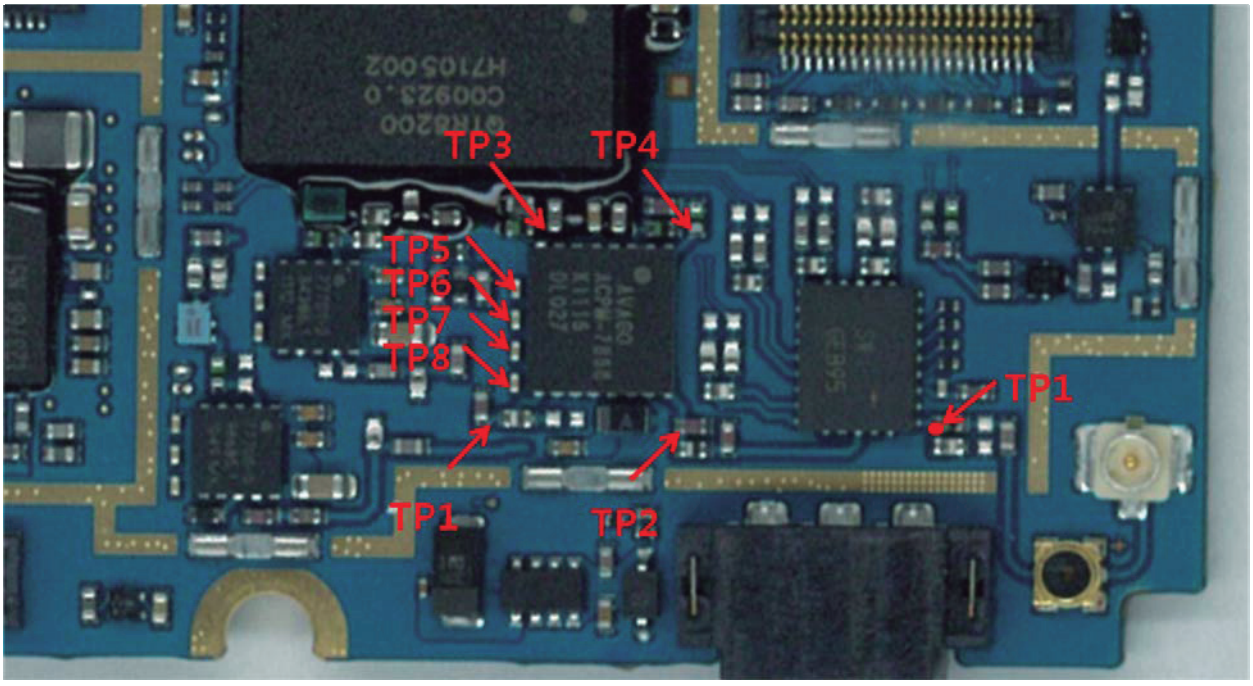
PA_ON_GLB or PA_ON_GHB must be HIGH (over 2.6V)

PAM IN/OUT Signal

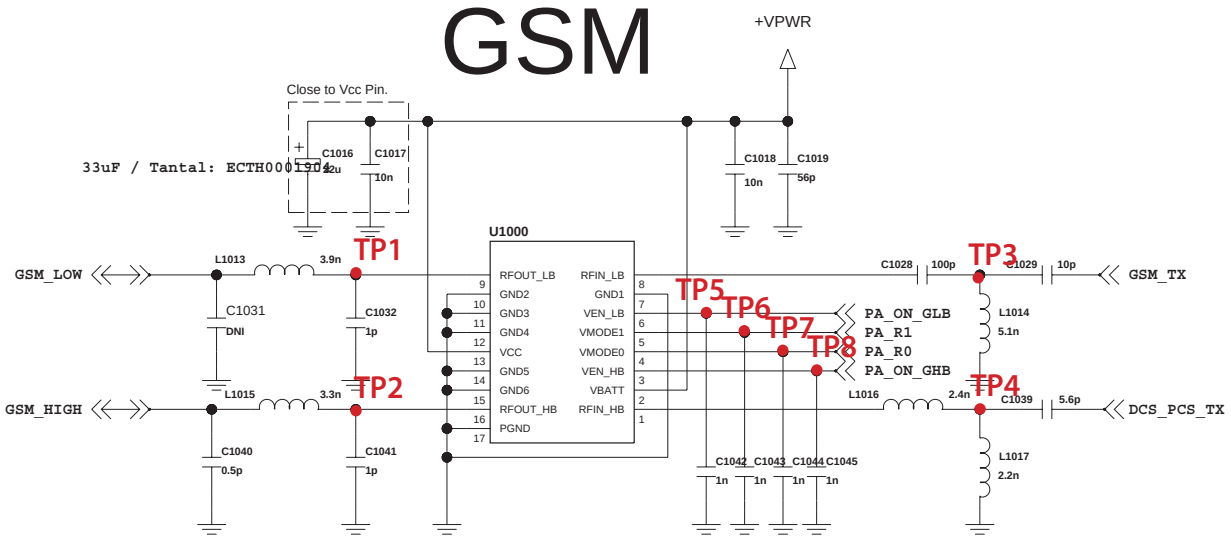
When PAM is under the operation of high power mode (PA_R0(C1084):Low),

PAM OUT power must be over 21 dBm

PAM IN power must be under 10 dBm



<Test Point (GSM PAM block)>

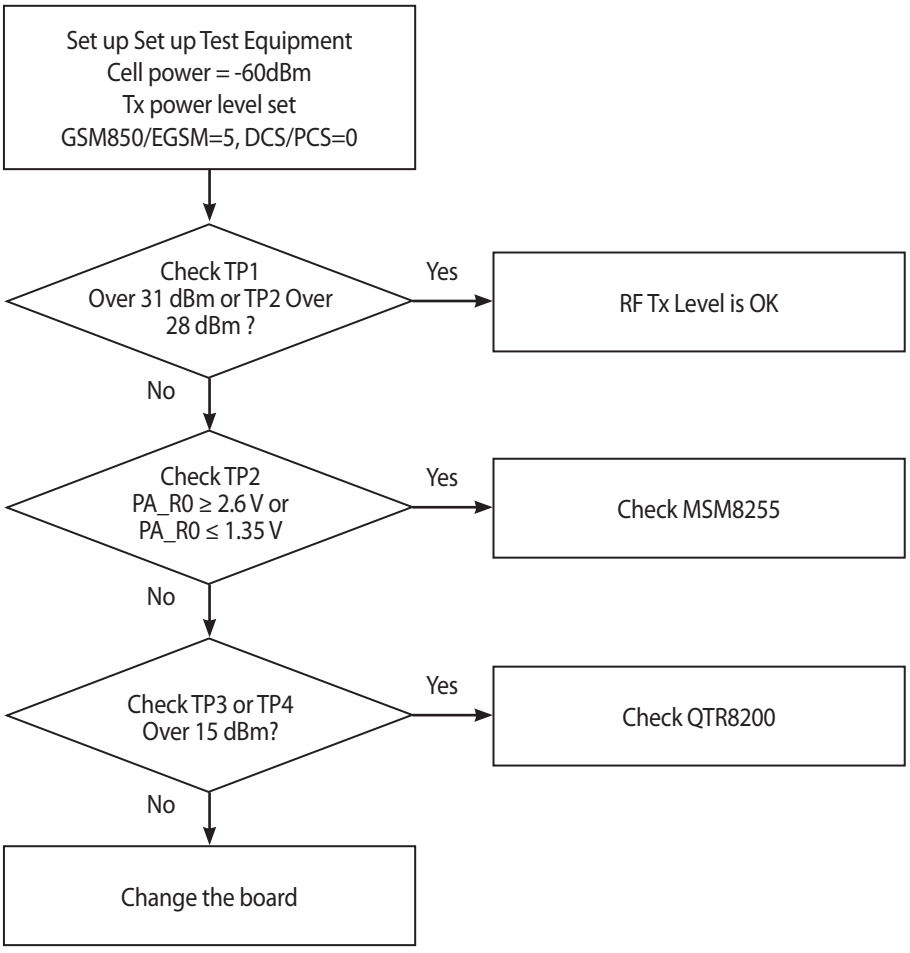


Selected Band & Power Mode	Ven_LB	Ven_HB	Vmode0	Vmode1
Power Down	Low	Low	X	X
Low Band – High Power Mode (HPM)	High	Low	Low	Low
Low Band – Medium Power Mode (MPM)	High	Low	Low	High
Low Band – Low Power Mode (LPM)	High	Low	High	Low
Low Band – Ultra Low Power Mode (ULPM)	High	Low	High	High
High Band – High Power Mode (HPM)	Low	High	Low	Low
High Band – Low Power Mode (LPM)	Low	High	High	Low
High Band – Ultra Low Power Mode (ULPM)	Low	High	High	High

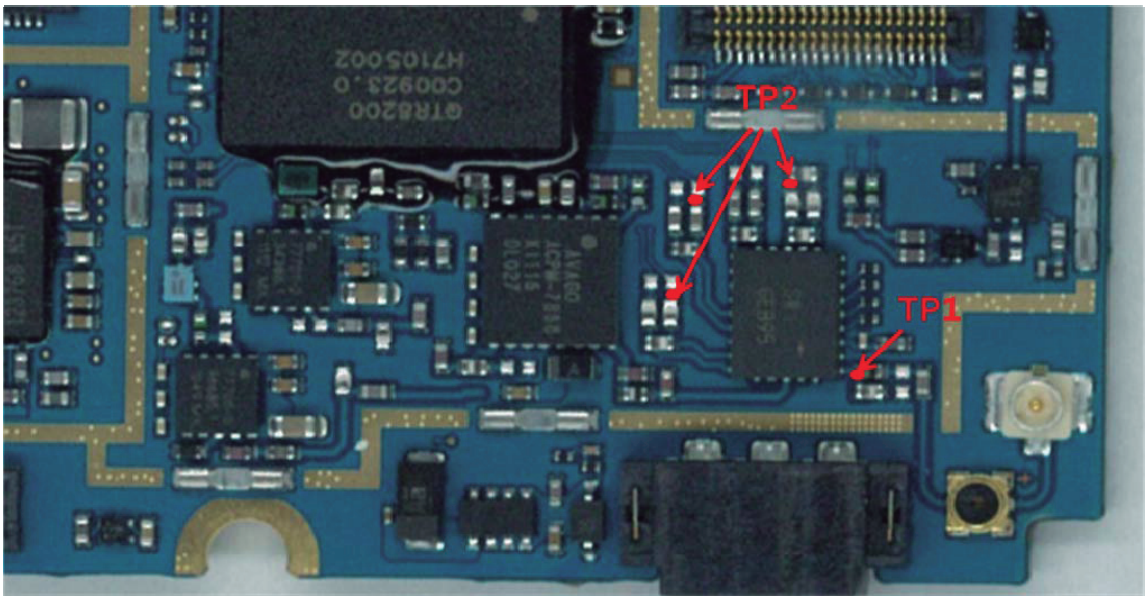
<Operating logic table>

Power Mode	GMSK	EDGE
Low Band – High Power Mode	30.5dBm < Pout ≤ Psat	23dBm < Pout ≤ 29dBm
Low Band – Medium Power Mode	16dBm < Pout ≤ 30.5dBm	12dBm < Pout ≤ 23dBm
Low Band – Low Power Mode	Pout ≤ 16dBm	Pout ≤ 12dBm
Low Band – Ultra Low Power Mode	Pout ≤ 16dBm	-
High Band – High Power Mode	17dBm < Pout ≤ Psat	16dBm < Pout ≤ 28dBm
High Band – Low Power Mode	11dBm < Pout ≤ 17dBm	Pout ≤ 16dBm
High Band – Ultra Low Power Mode	Pout ≤ 11dBm	-

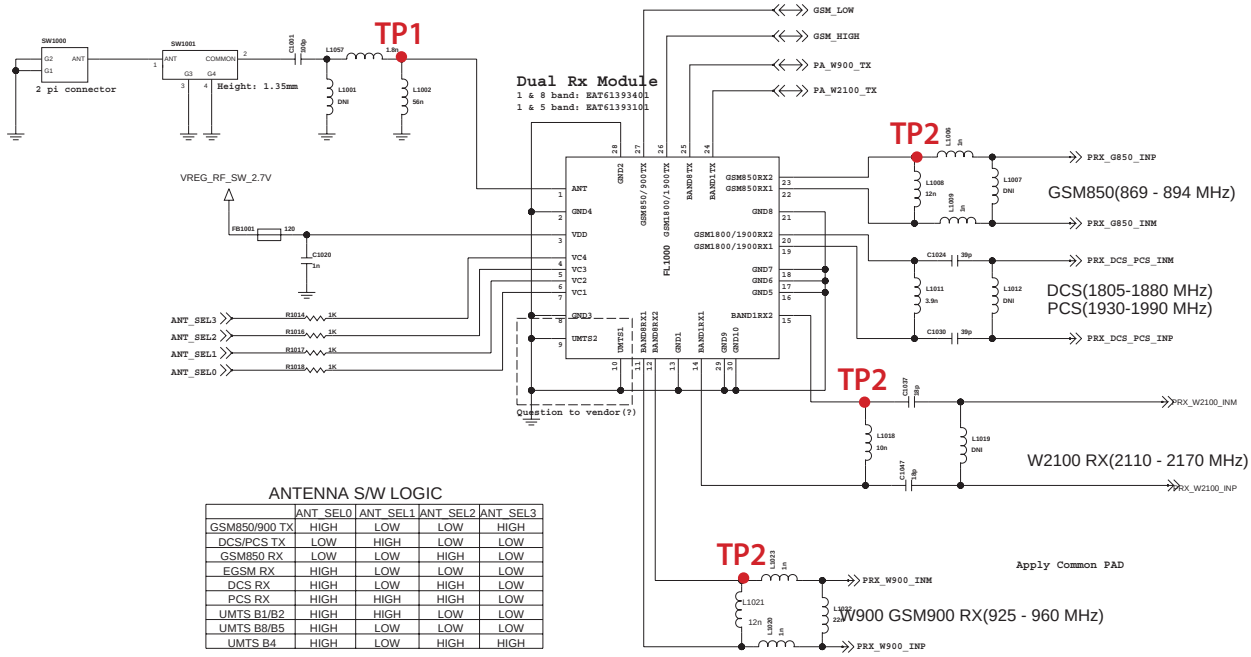
<Power levels for each modes table>



4.6.4 Checking RF Rx Block

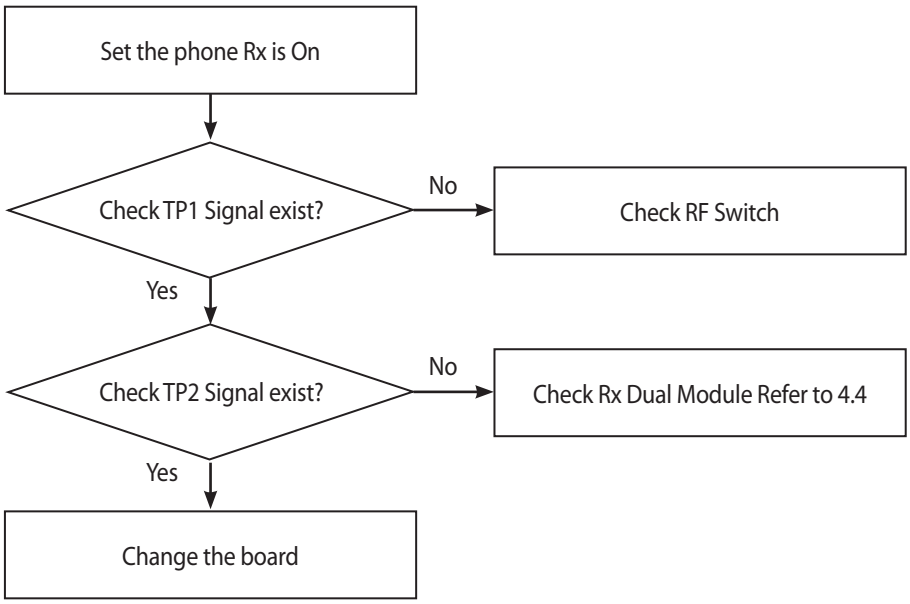


<Test Point (GSM RF Rx Level)>



ANTENNA S/W LOGIC

	ANT_SEL0	ANT_SEL1	ANT_SEL2	ANT_SEL3
GSM850/900 TX	HIGH	LOW	LOW	HIGH
DCS/PCS TX	LOW	HIGH	LOW	LOW
GSM850 RX	LOW	LOW	HIGH	LOW
EGSM RX	HIGH	LOW	LOW	LOW
DCS RX	HIGH	LOW	HIGH	LOW
PCS RX	HIGH	HIGH	HIGH	LOW
UMTS B1/B2	HIGH	HIGH	LOW	LOW
UMTS B8/B5	HIGH	LOW	LOW	LOW
UMTS B4	HIGH	LOW	HIGH	HIGH



4.7 WIFI/BT/FM RF Trouble shooting

4.7.1 Wifi/BT/FM RF Components

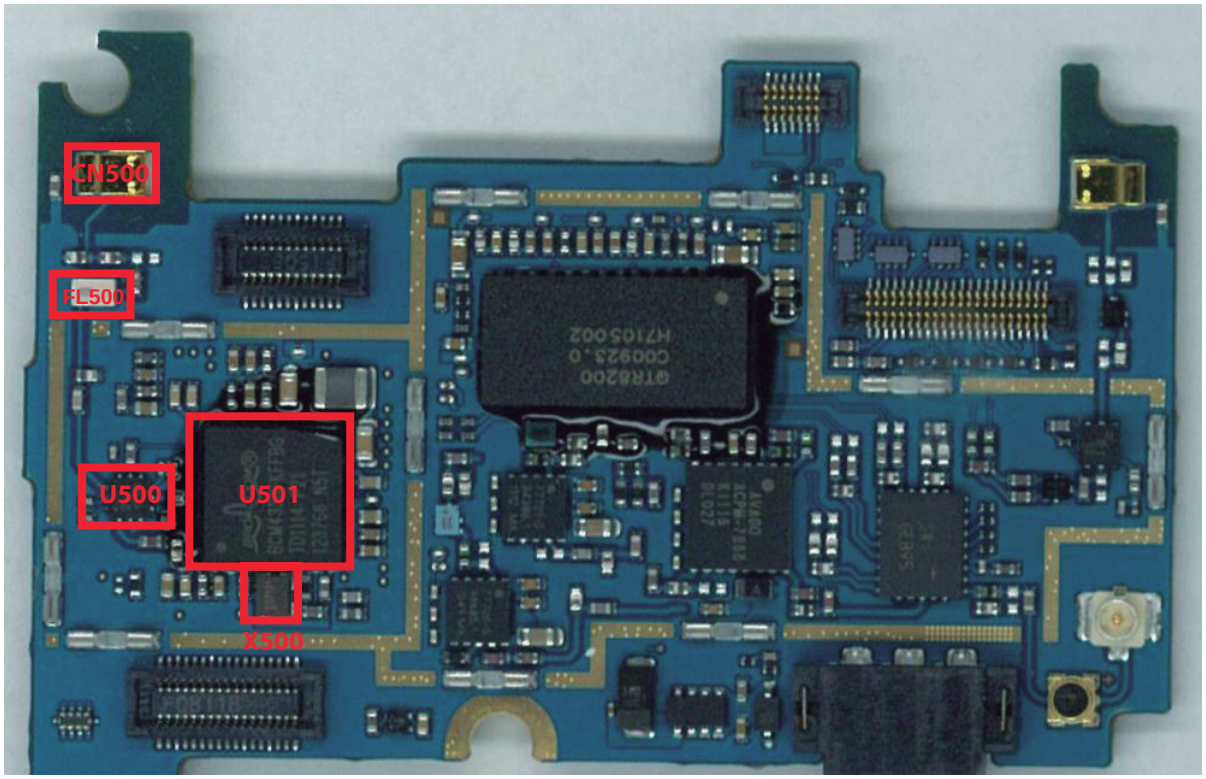


Figure. WiFi /BT /FM Components on bottom side of the E730 bear board.

Reference	Description
U501	WiFi/BT/FM Chip (BCM4330)
U500	FEM Module (SP3T + LNA)
FL500	Dielectric Filter (2450MHz)
X500	XO (37.4MHz)
CN500	ANT PAD

4.7.2 Wifi/BT/FM Signal Path

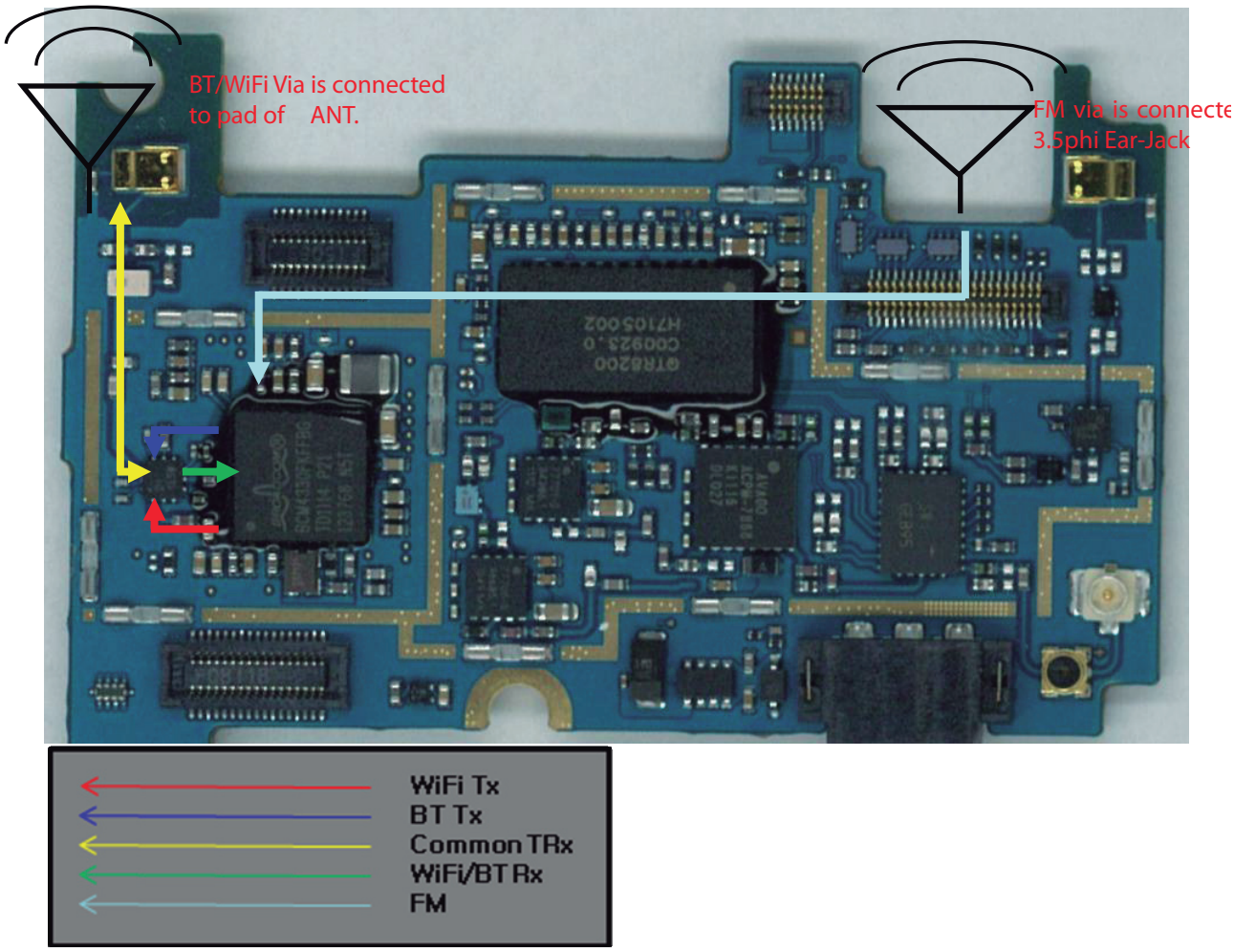
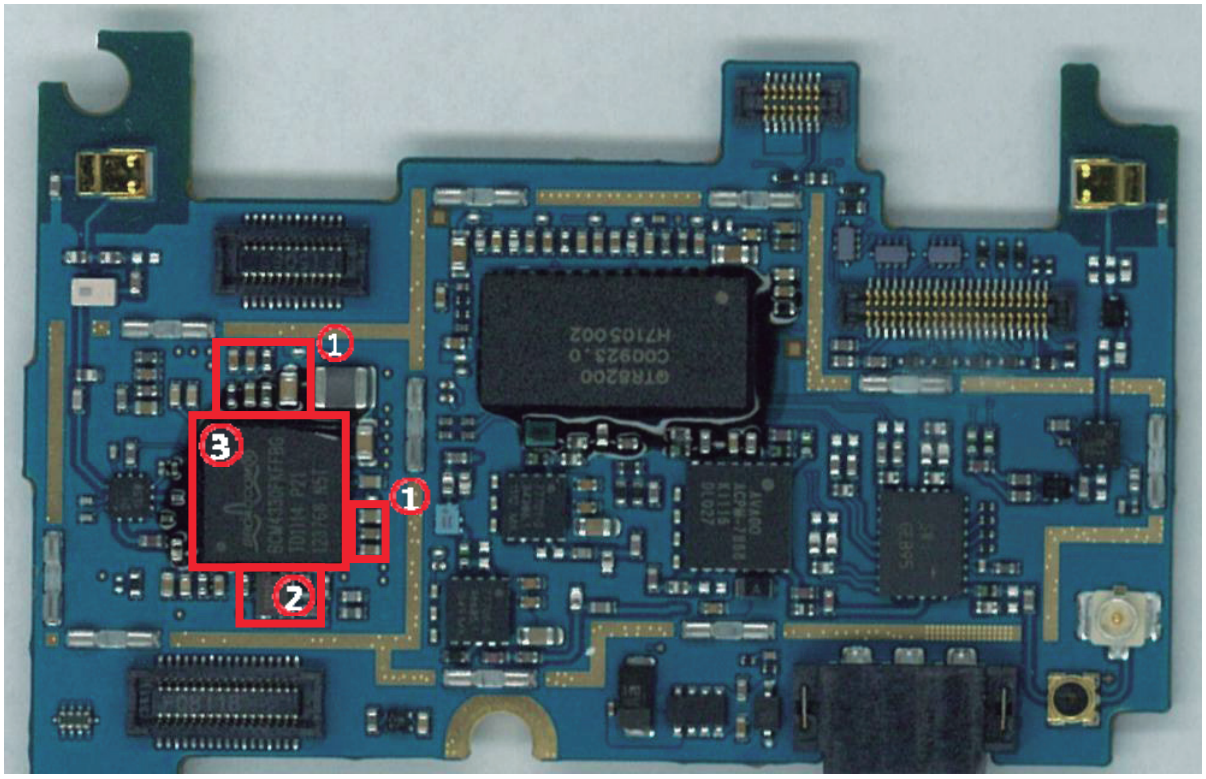
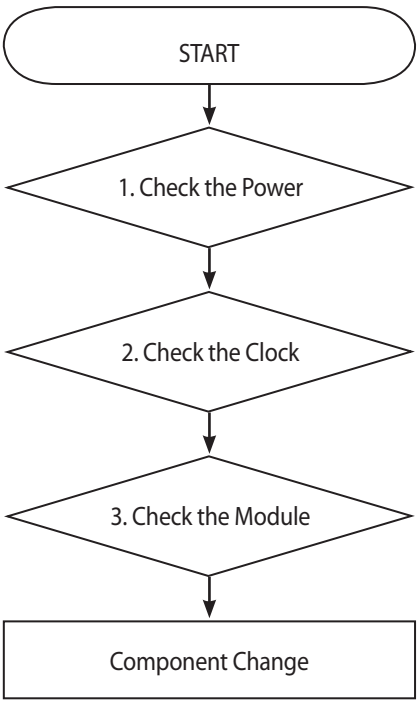


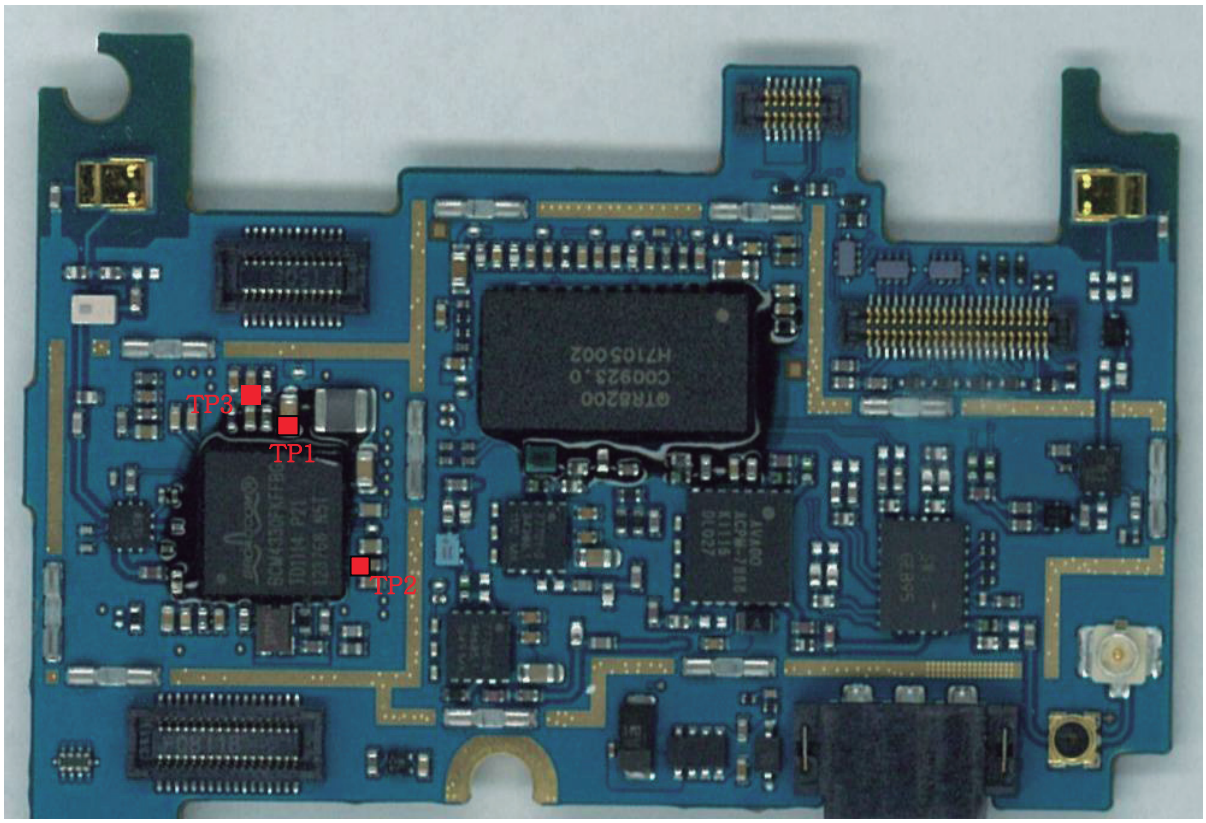
Figure. RF signal path of WiFi/BT/FM on bottom side of the E730 bear board.

4.7.3 WIFI/BT/FM Block

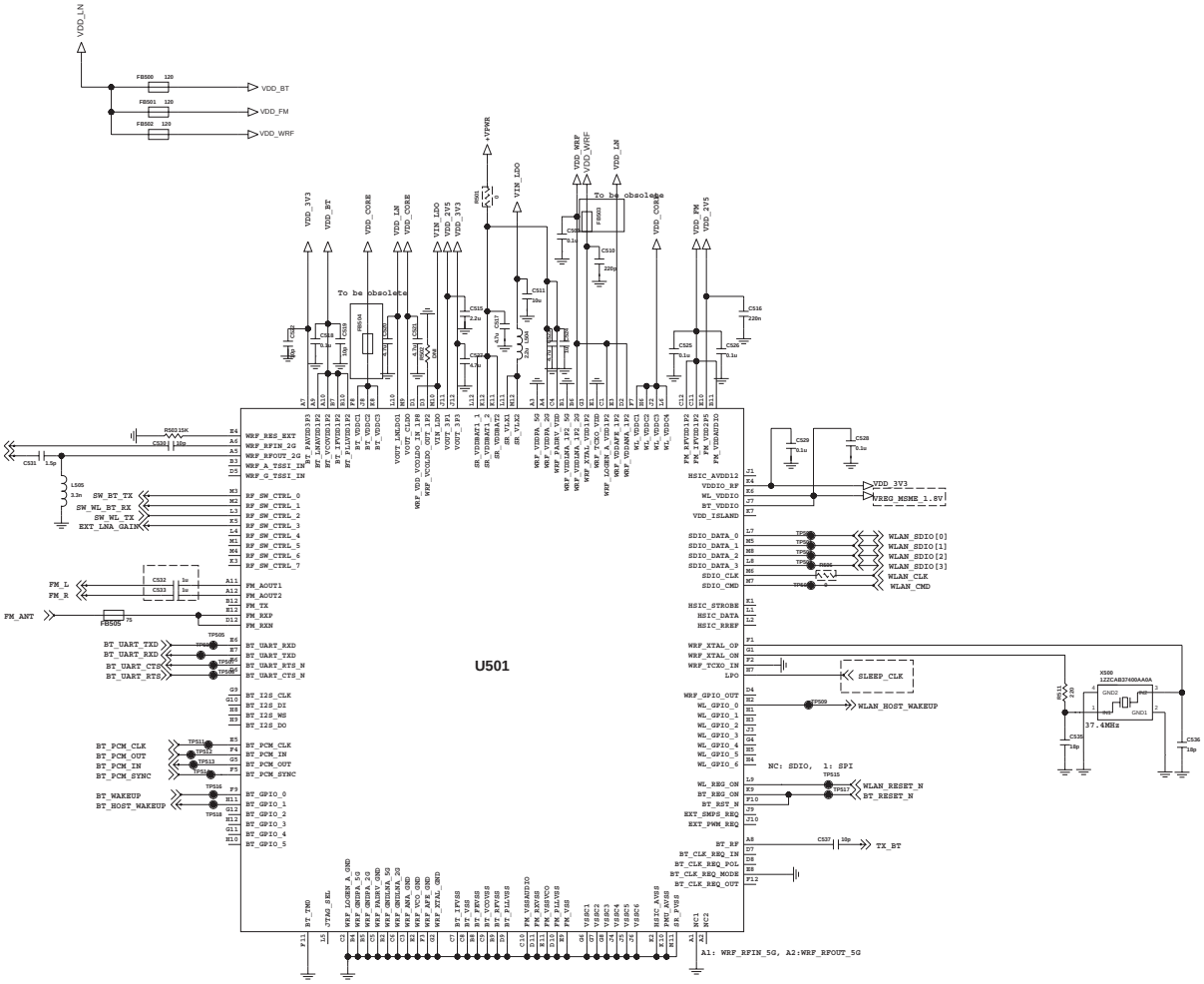


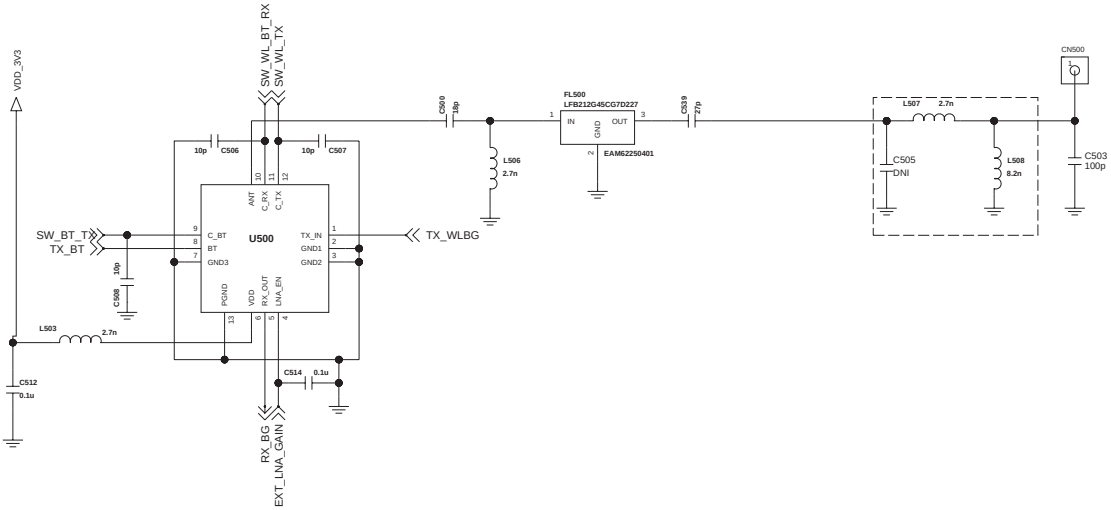


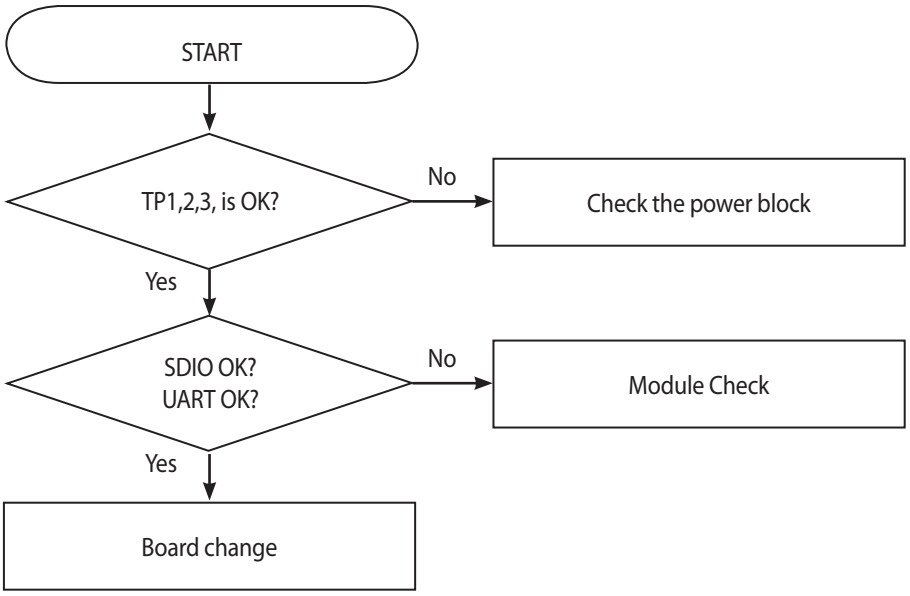
4.7.3.1 WIFI/BT/FM Module part

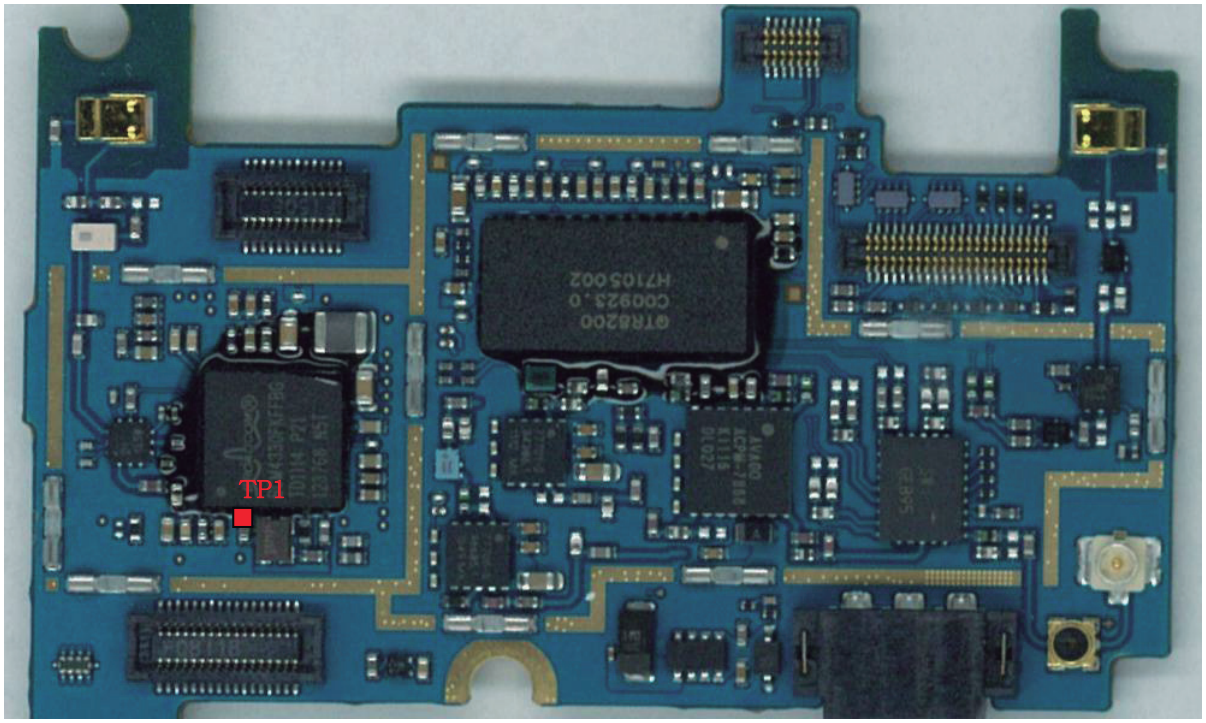


Test Point	Net name	Description
TP1	+VPWR	Power for BT/WiFi/FM BB core and WiFi power AMP(VBATT)
TP2	VREG_MSME_1.8V	Power for Host interface. (1.8V)
TP3	VDD_FM	Power fot FM RF/IF/Audio. (1.2V)

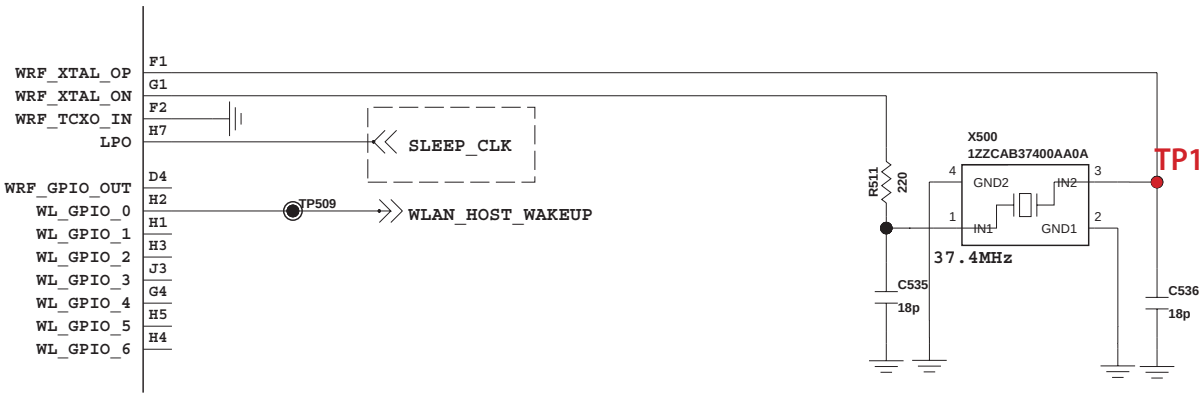








Test Point	Net name	Description
TP1	WRF_XTAL_OP	Crystal Oscillator Input. The default frequency reference is 37.4Mhz.



4.8 GPS/WIFI/BT RF components

4.8.1 GPS RF Components

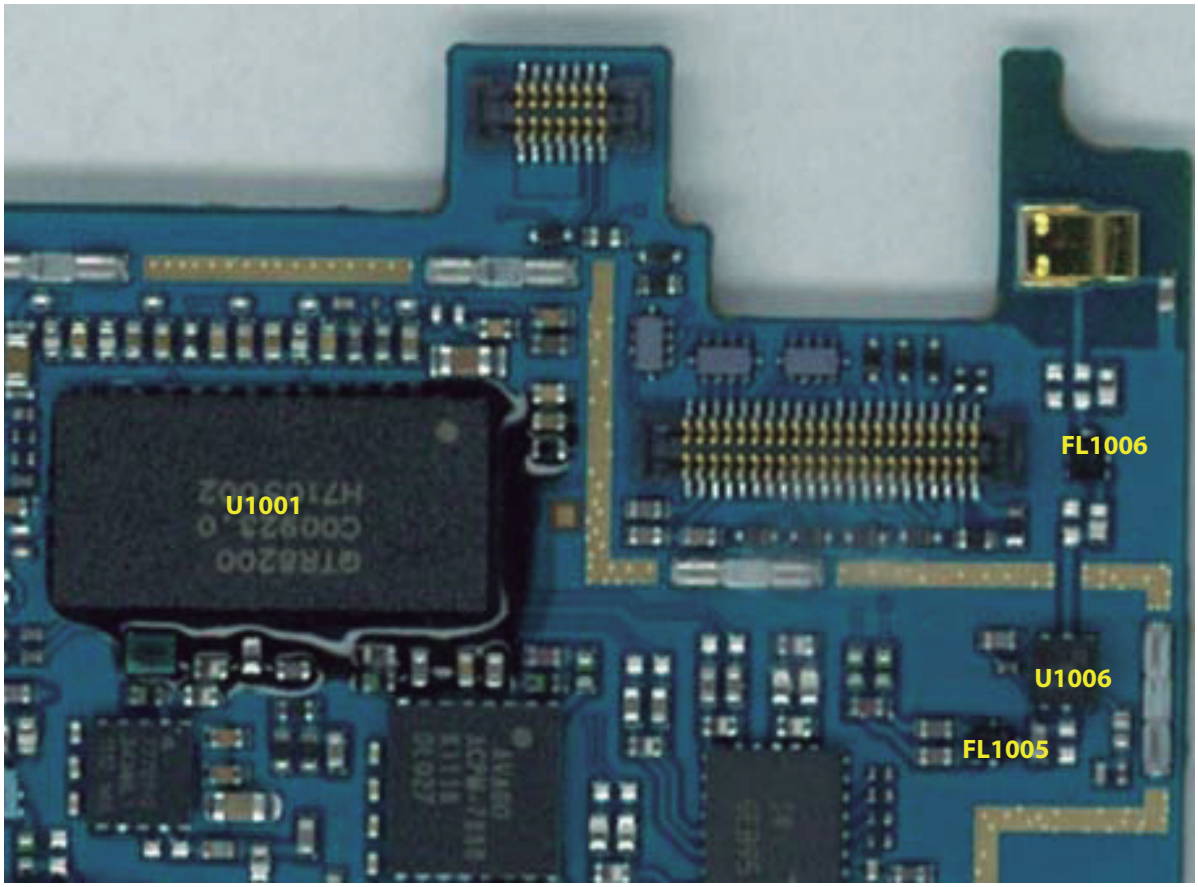


Figure. GPS RF Components on top side of the P970 bear board.

Reference	Description
FL1006	SAW Filter (1574.42~1605.89MHz)
U1006	LNA Module (LNA + SAW)
FL1005	SAW Filter (1574.42~1605.89MHz)
U1001	RF Transceiver

4.8.2 GPS Signal Path

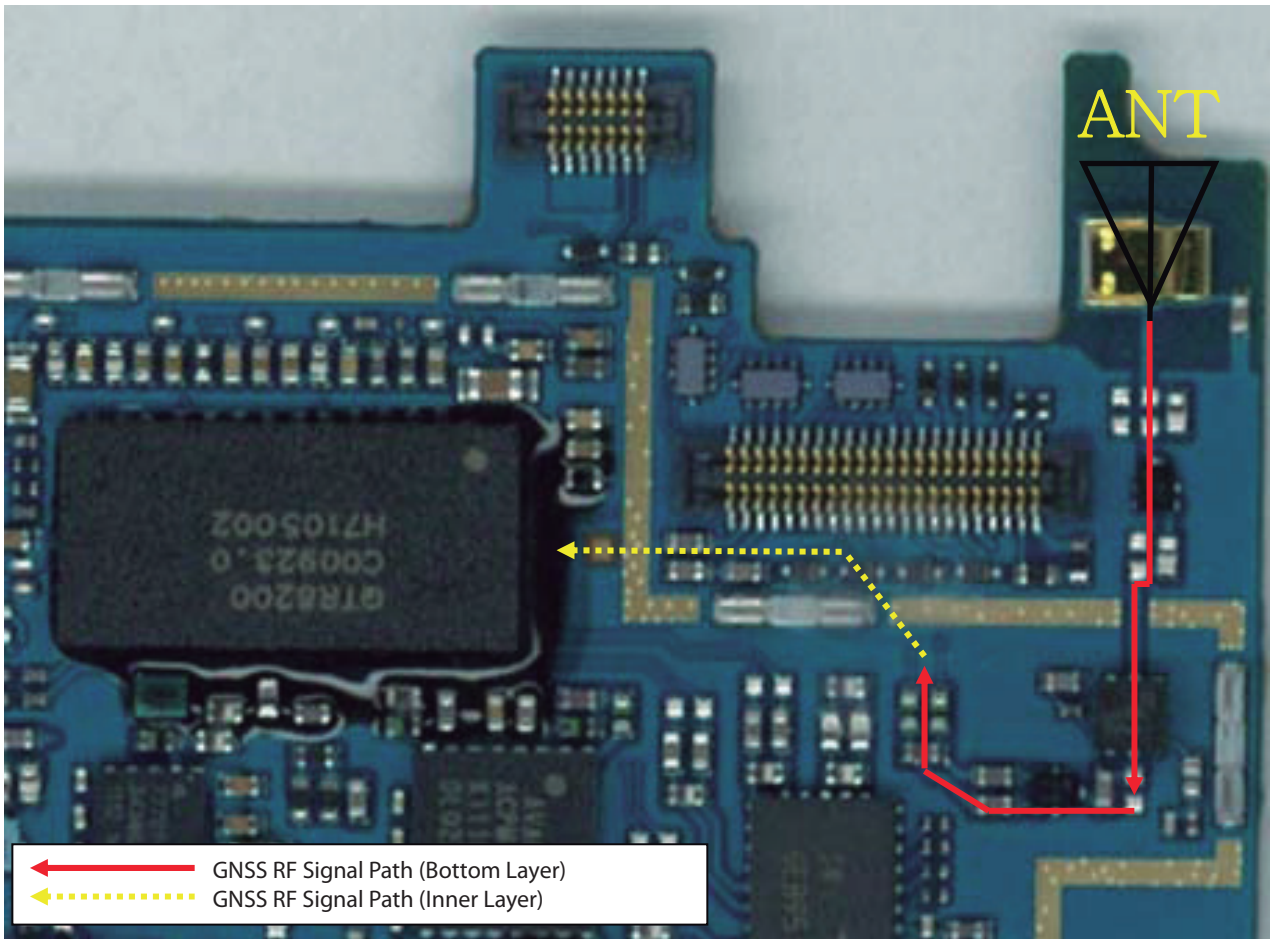
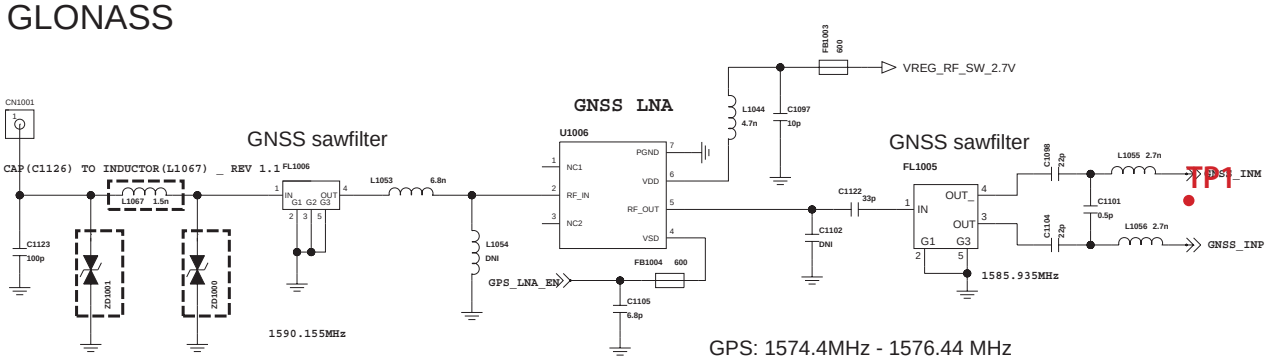
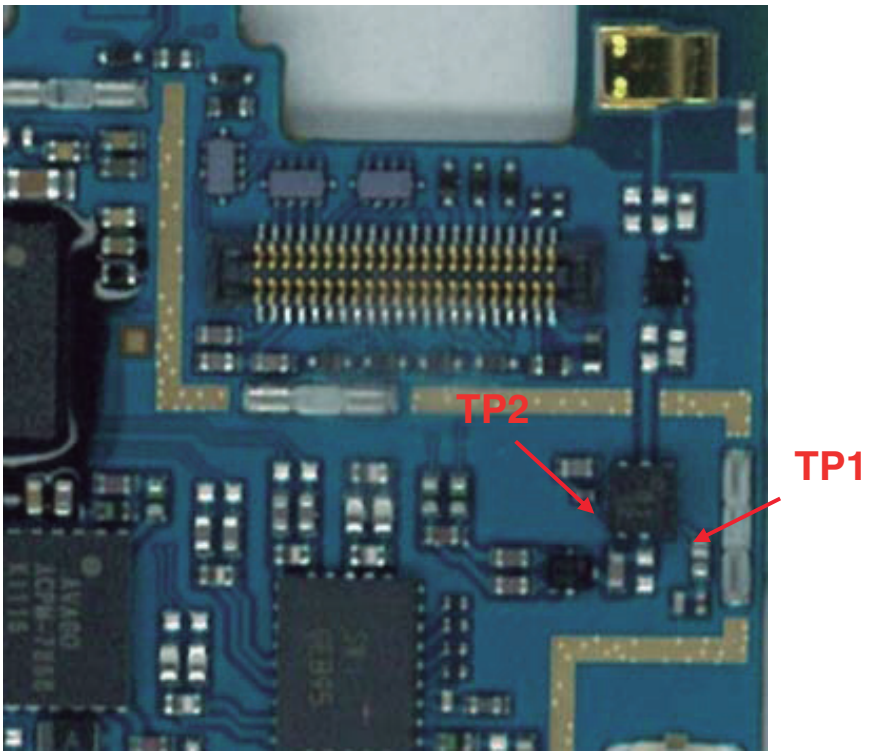


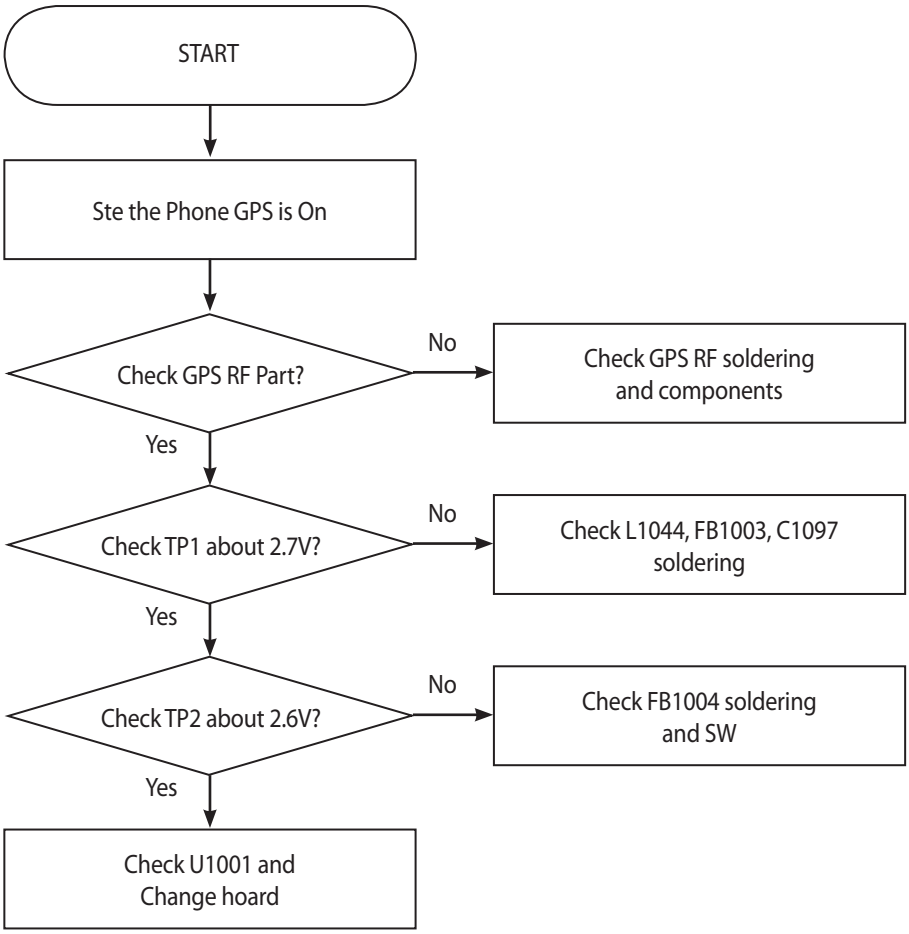
Figure. RF signal path of GPS on bottom side of the E730 bear board.

GLONASS



GPS: 1574.4MHz - 1576.44 MHz
GLONASS: 1597.55 MHz - 1605.89 MHz

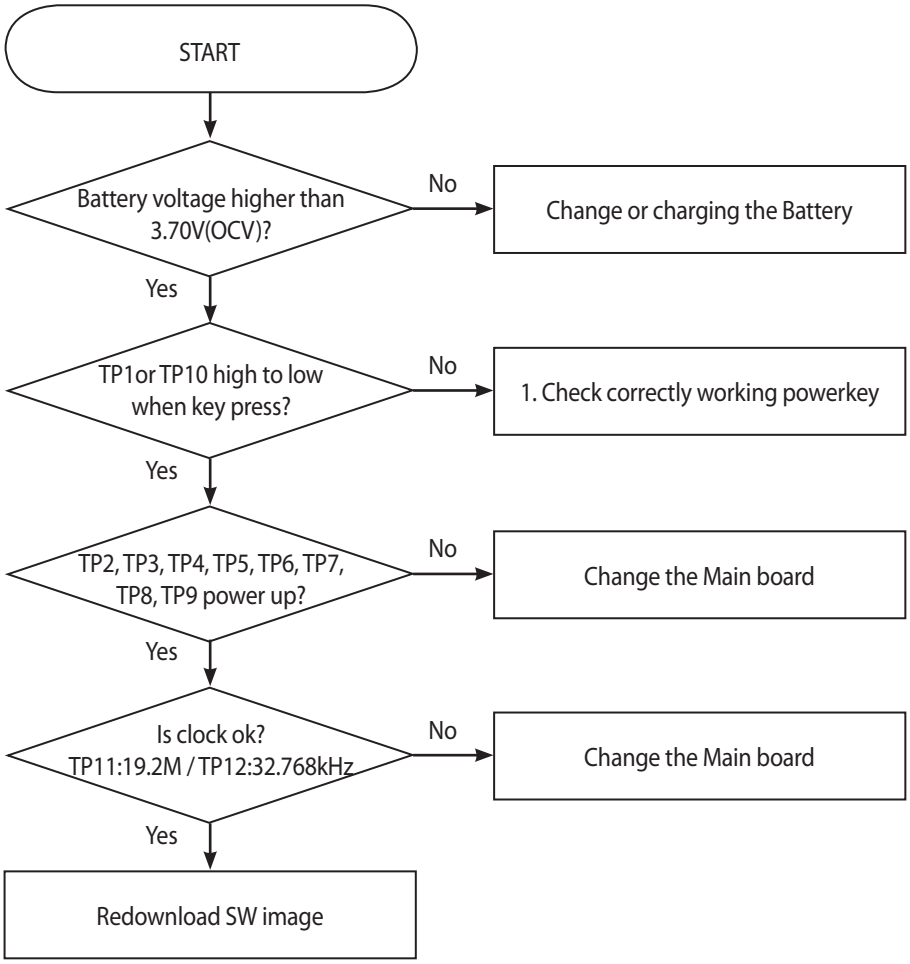


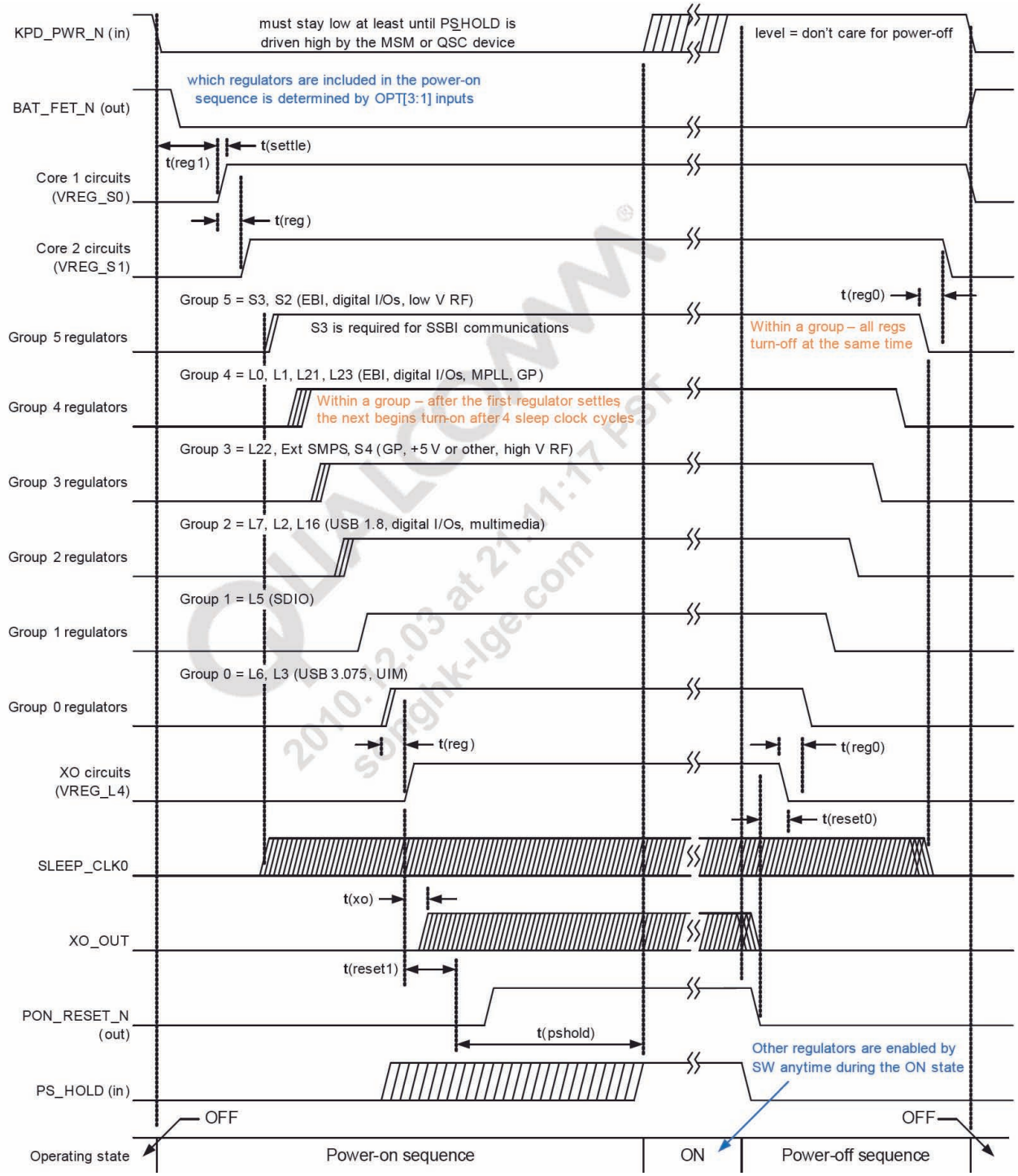


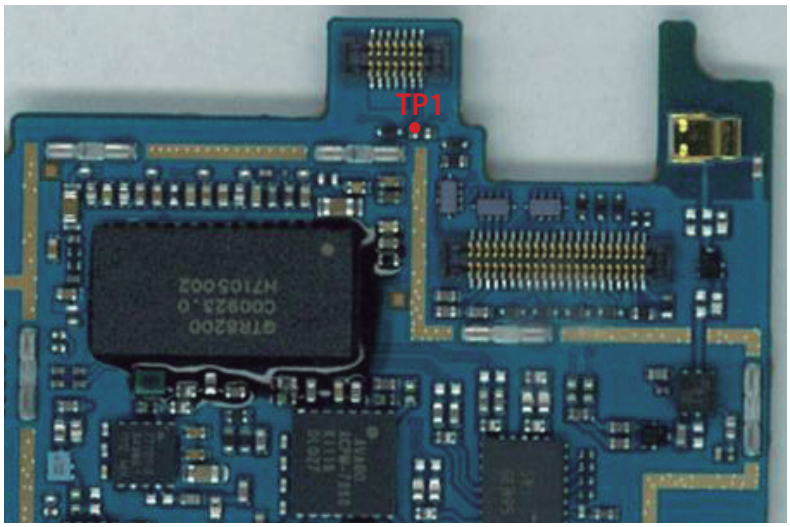
4.9 Power ON Trouble shooting

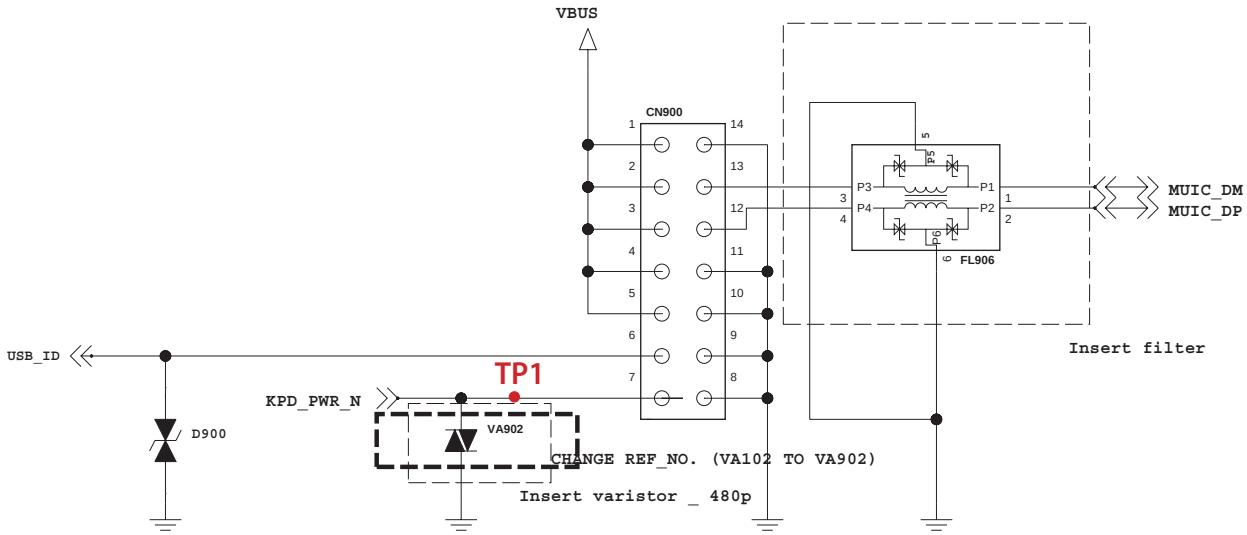
Power On sequence of C660 is :

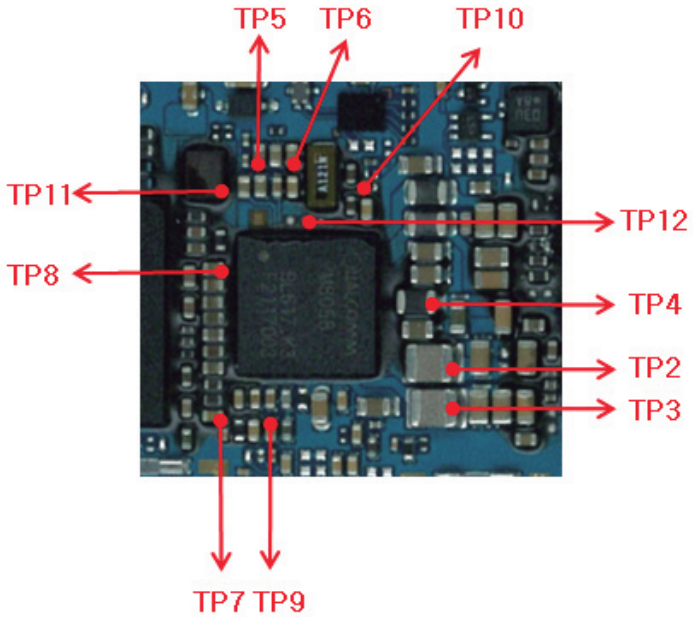
Power key press → TP1 go to low → PM8058 Power Up → TP3, TP4, TP5, TP6, TP7, TP8, TP9 power ON → Phone booting and TP10 go to High

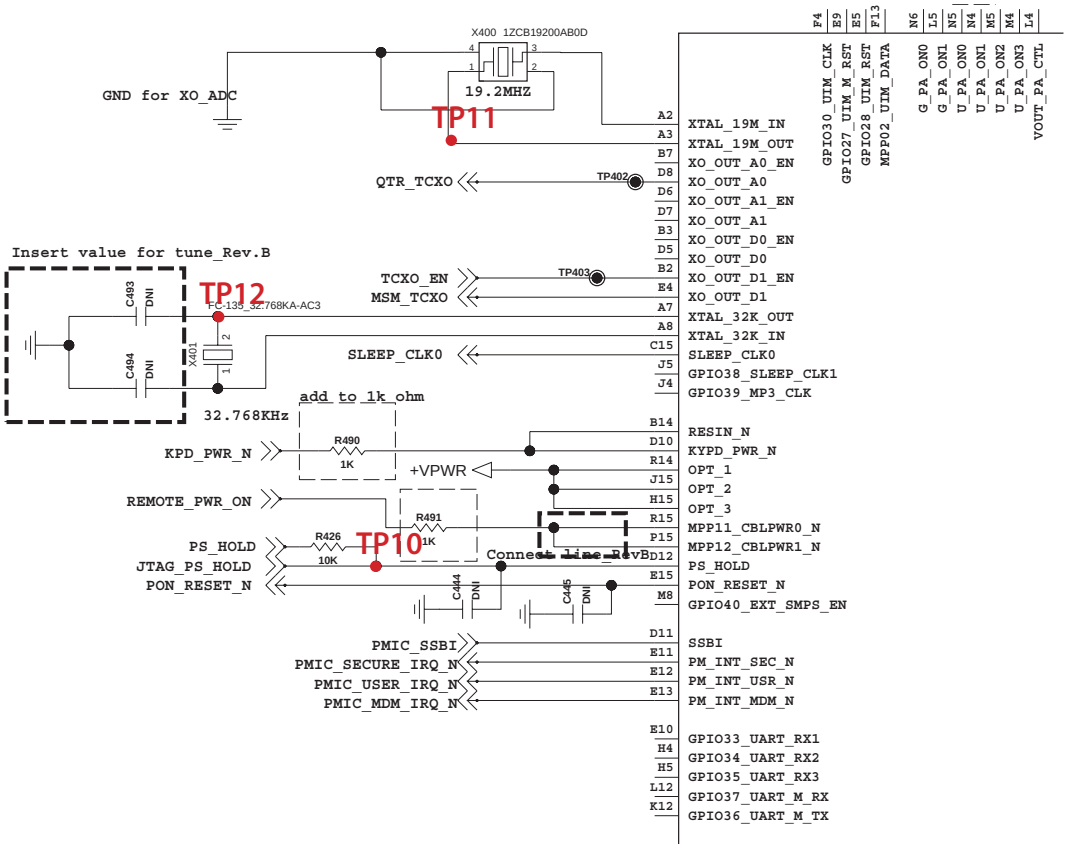


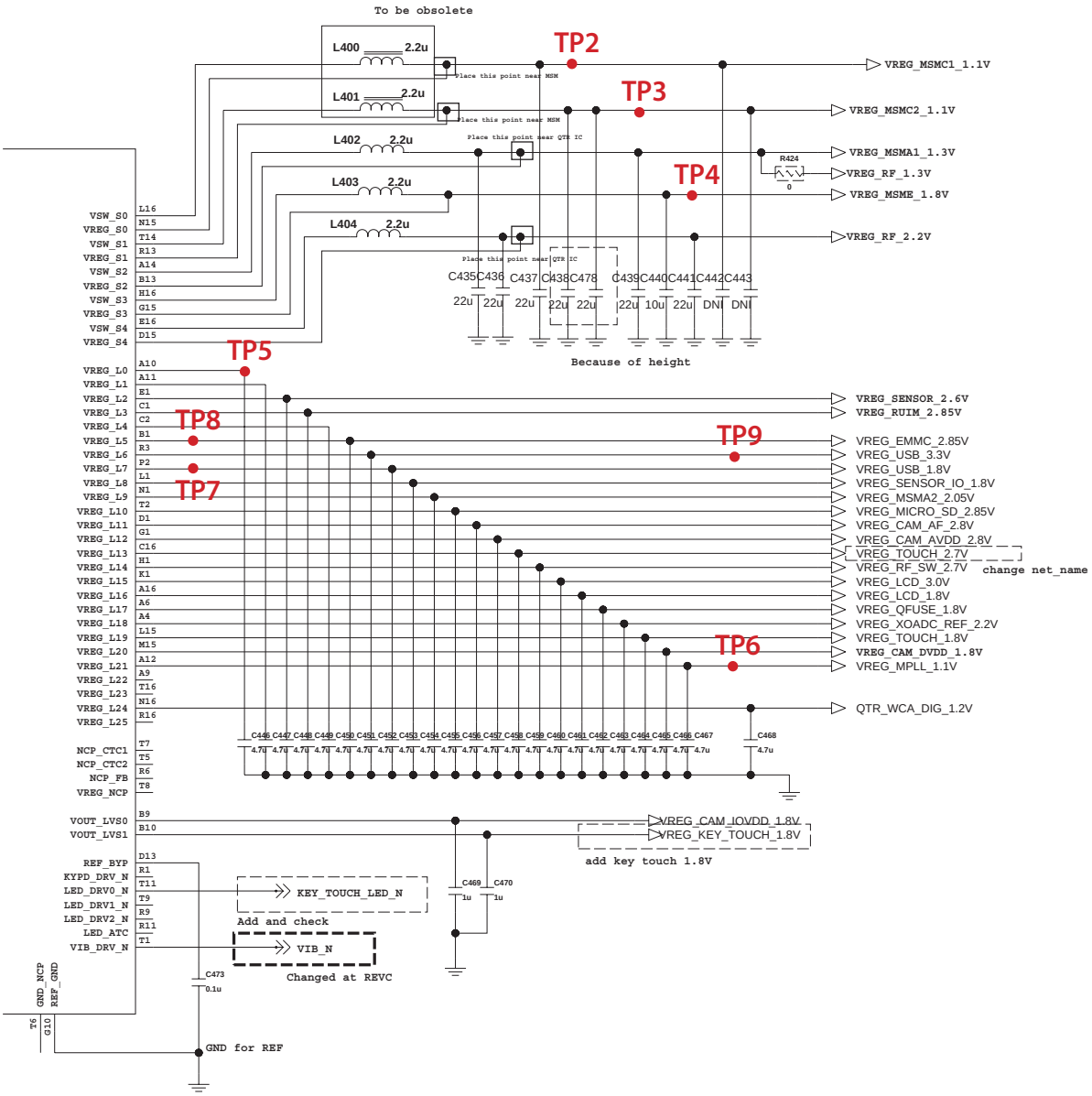








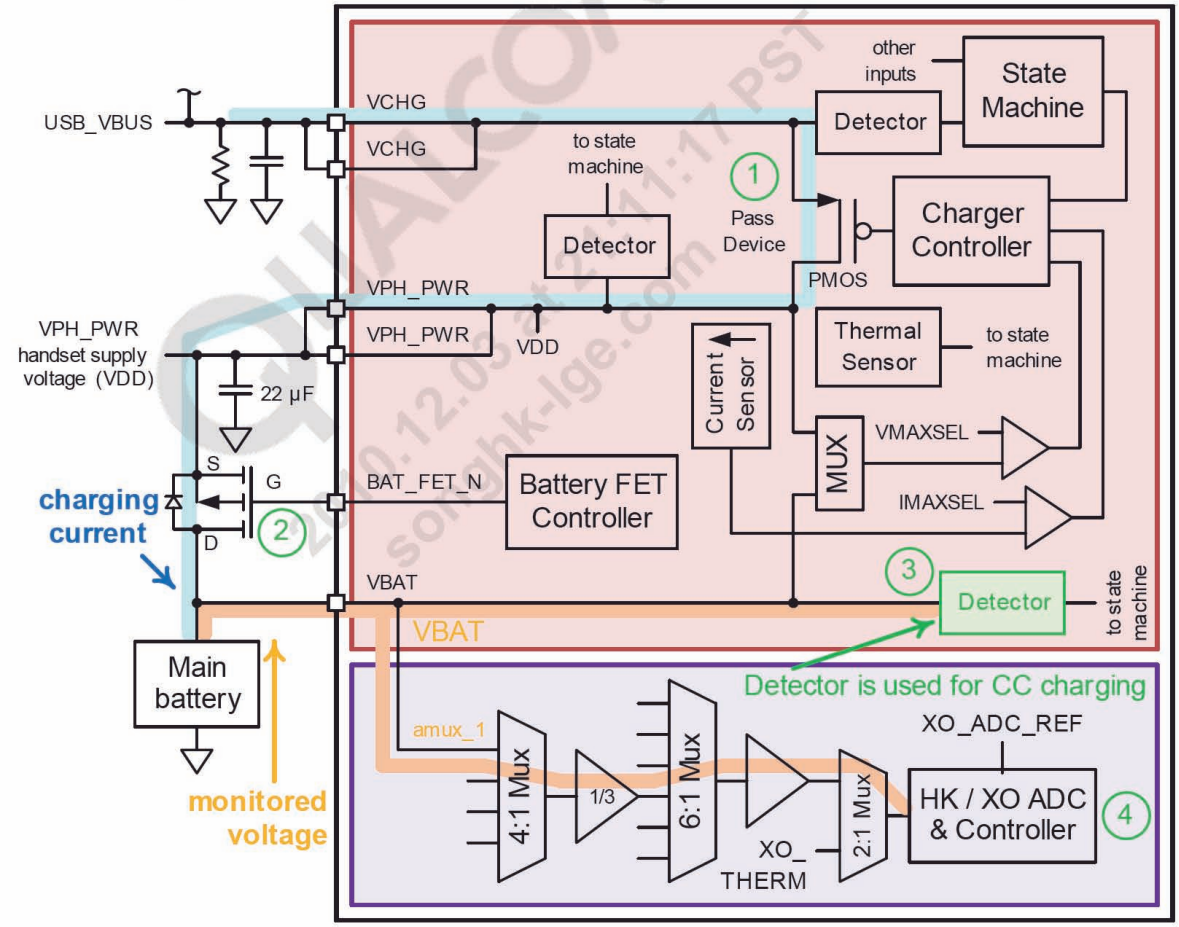




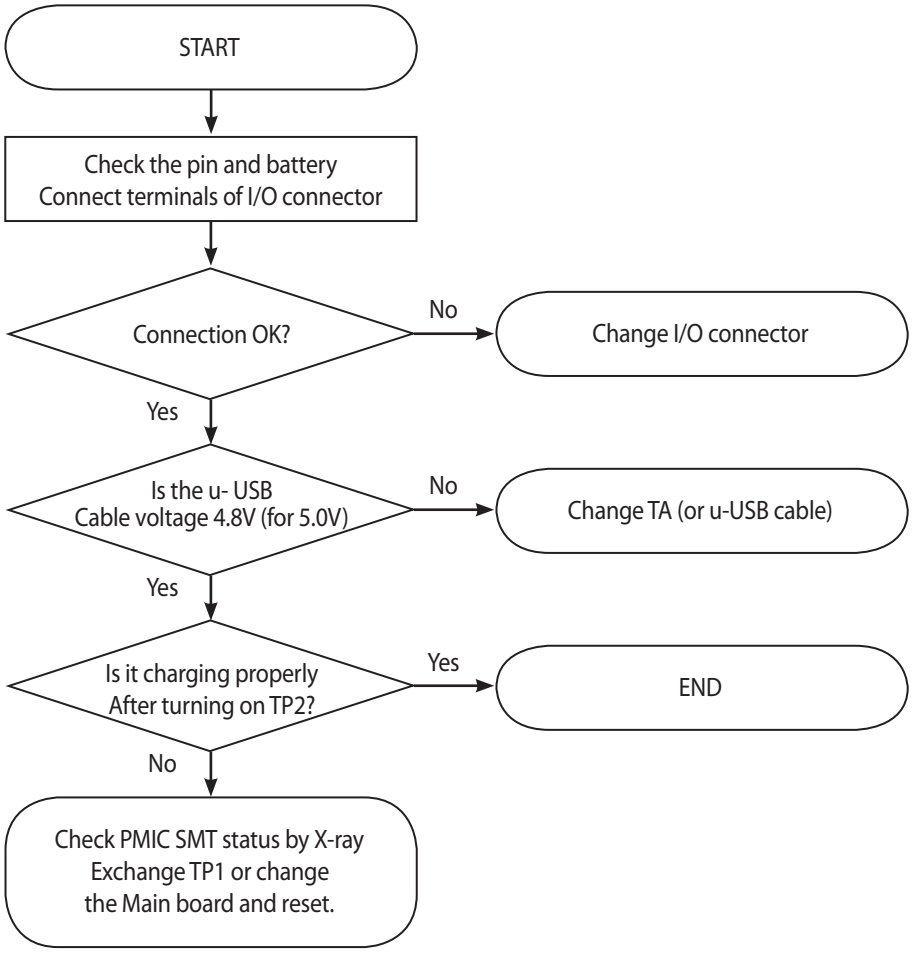
4.10 Charging Trouble shooting

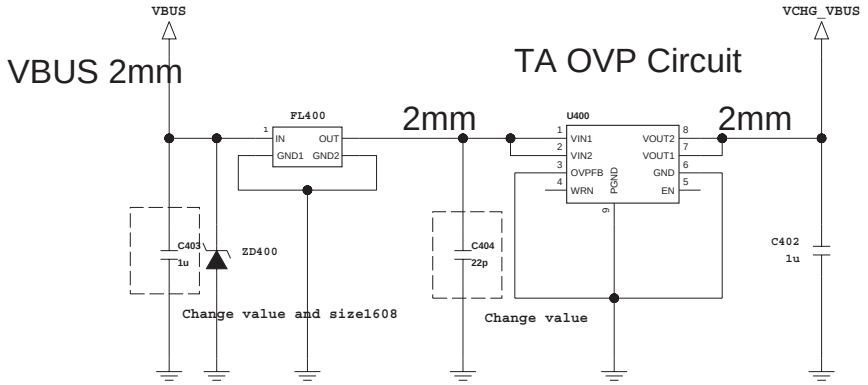
Changing method

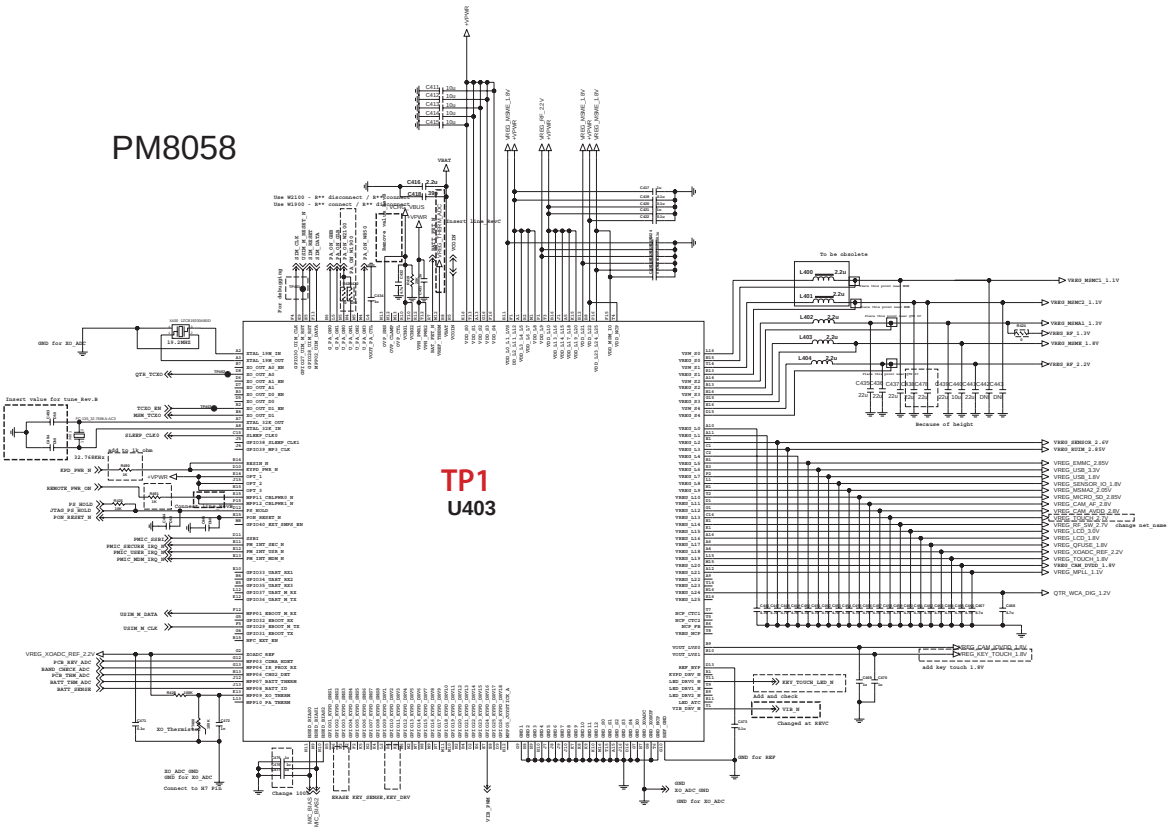
1) The pass device is on – continuously closed -loop controlled to regulate the total current.
2) The battery MOSFET is fully on, thereby connecting the battery to the VDD node.

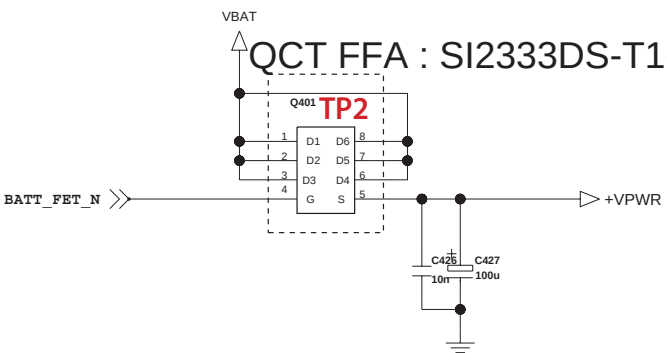


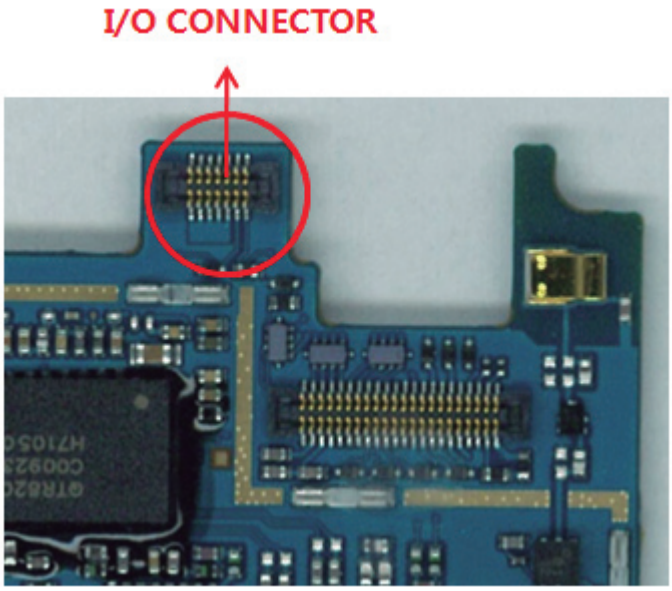
- The battery is charged with a constant current level that is set by the current regulation loop or the current-limited external supply.
- As VBAT rises and approaches its desired value, the charging current begins to decrease.
- This is the end of constant current charging and the beginning of residual charging – as explained in the following figure.

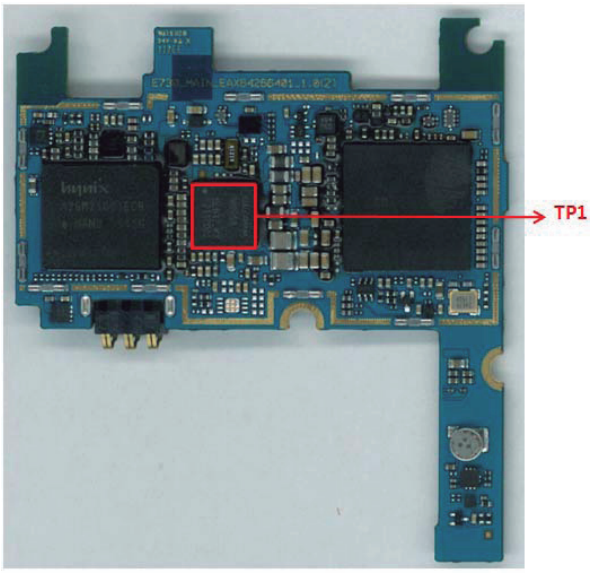


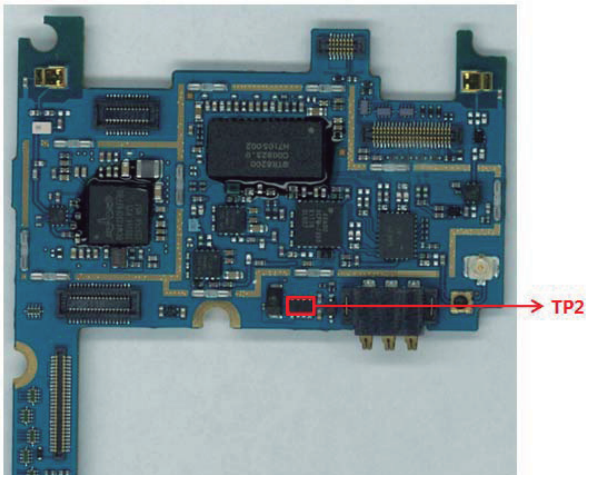












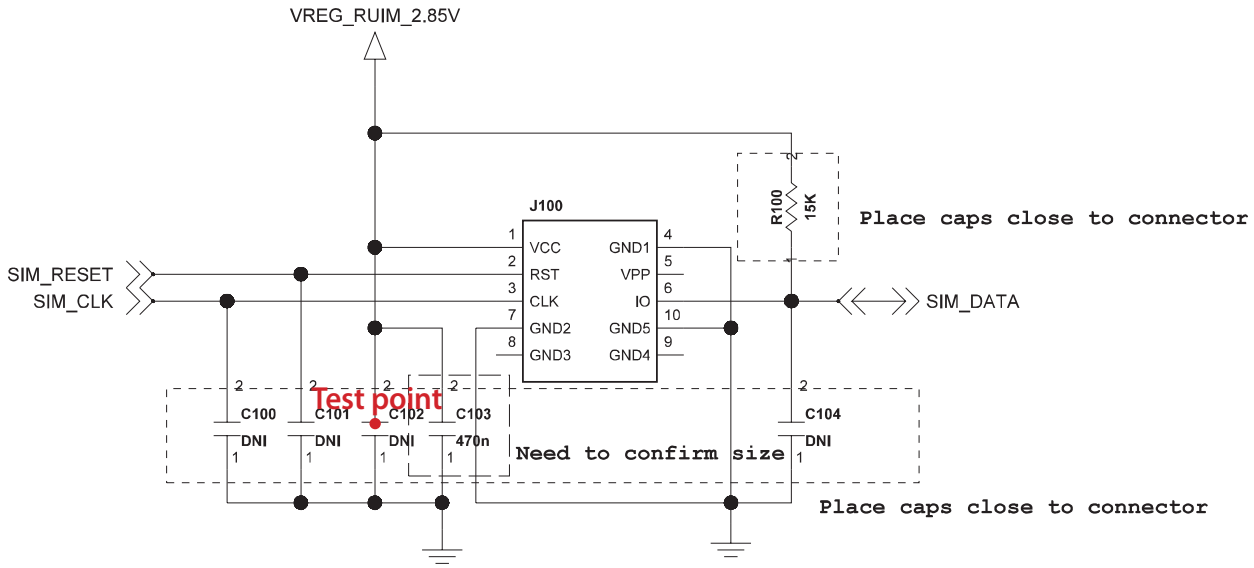
4.11 SIM Detect Trouble shooting

MSM generates SIM interface signals(1.8V level) to PM8058.

PM8058 converts SIM interface signals to 3V.

Test point

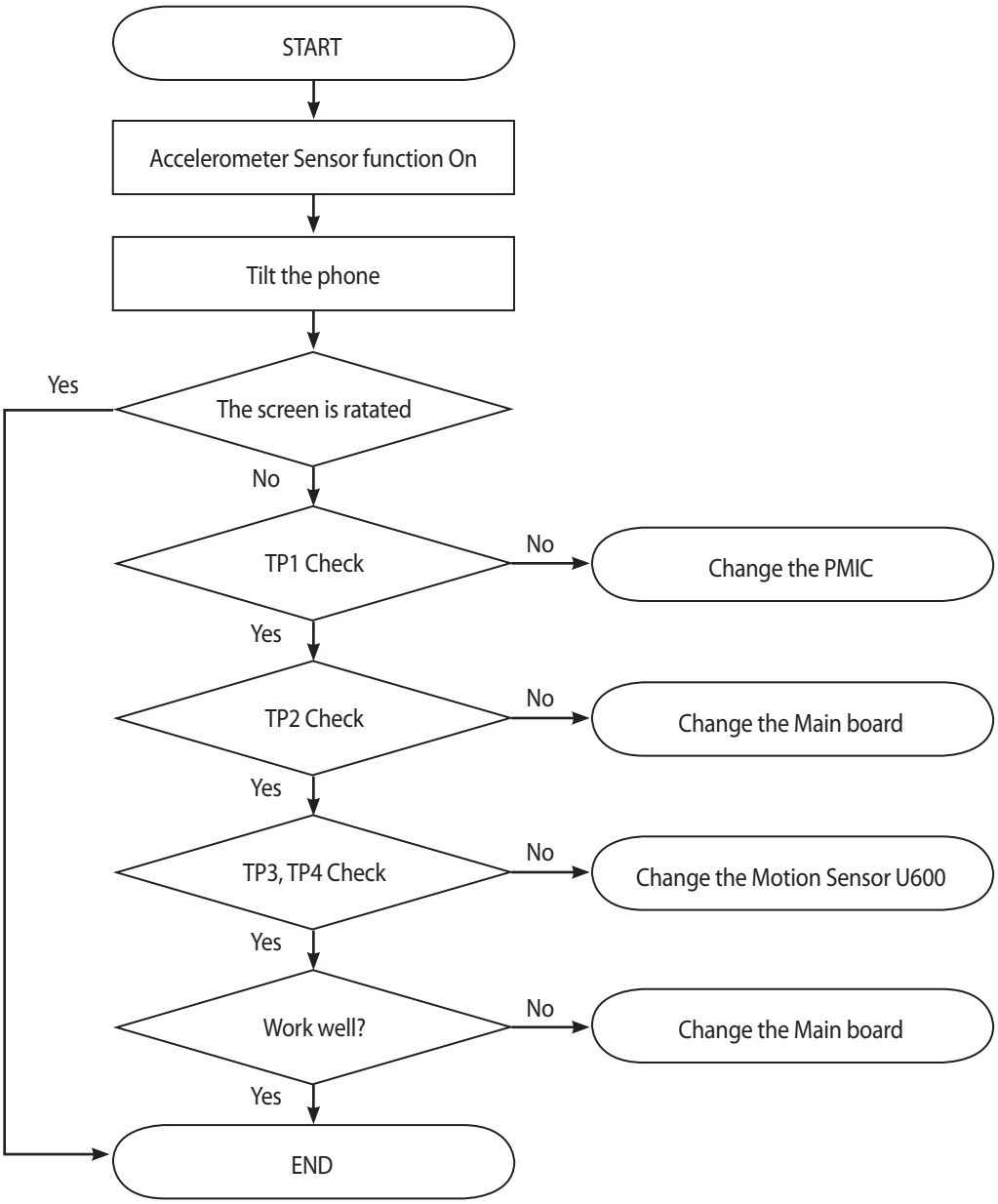
Circuit



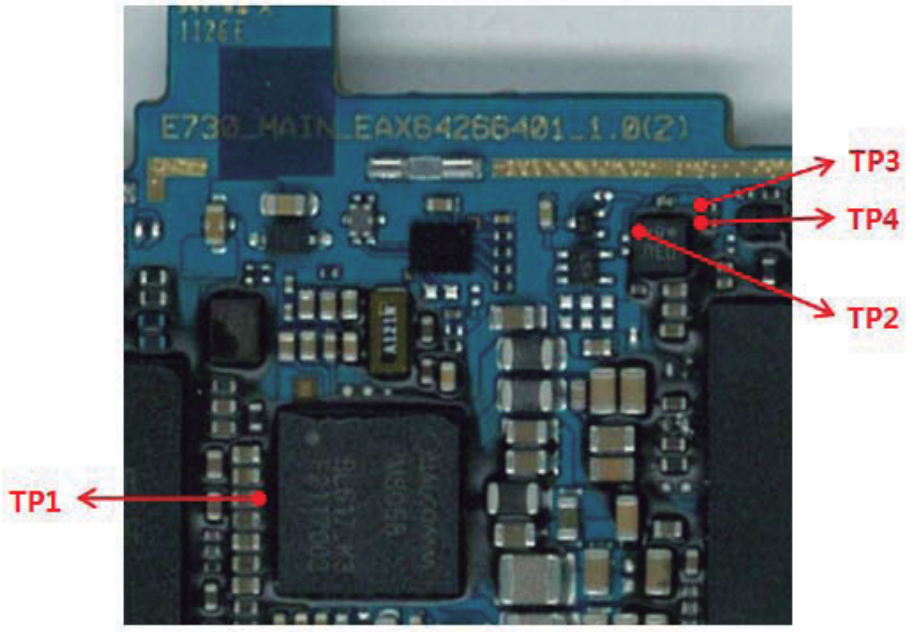
4.12 Motion Sensor on/off Trouble Shooting

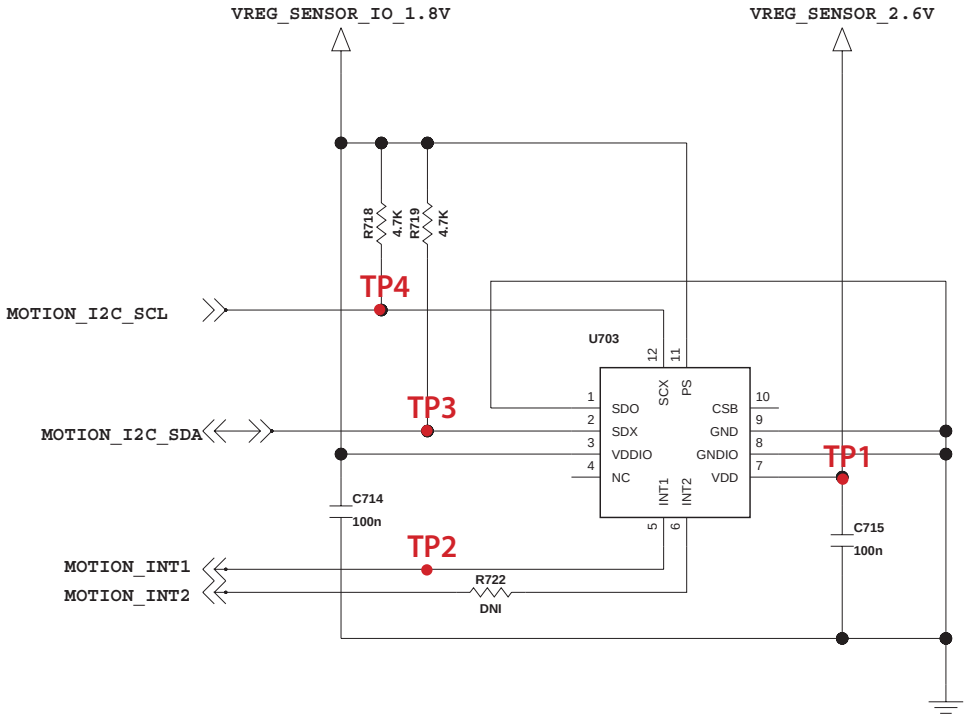
Motion Sensor is worked as below :

Accelerometer Sensor function On → Tilt the phone (90˚) → The screen is had rotated automatically.



Measurement
VREG_SENSOR_2.6V(TP1)
MOTION_INT1(TP2)
MOTION_I2C_SDA(TP3)
MOTION_I2C_ SCL(TP4)

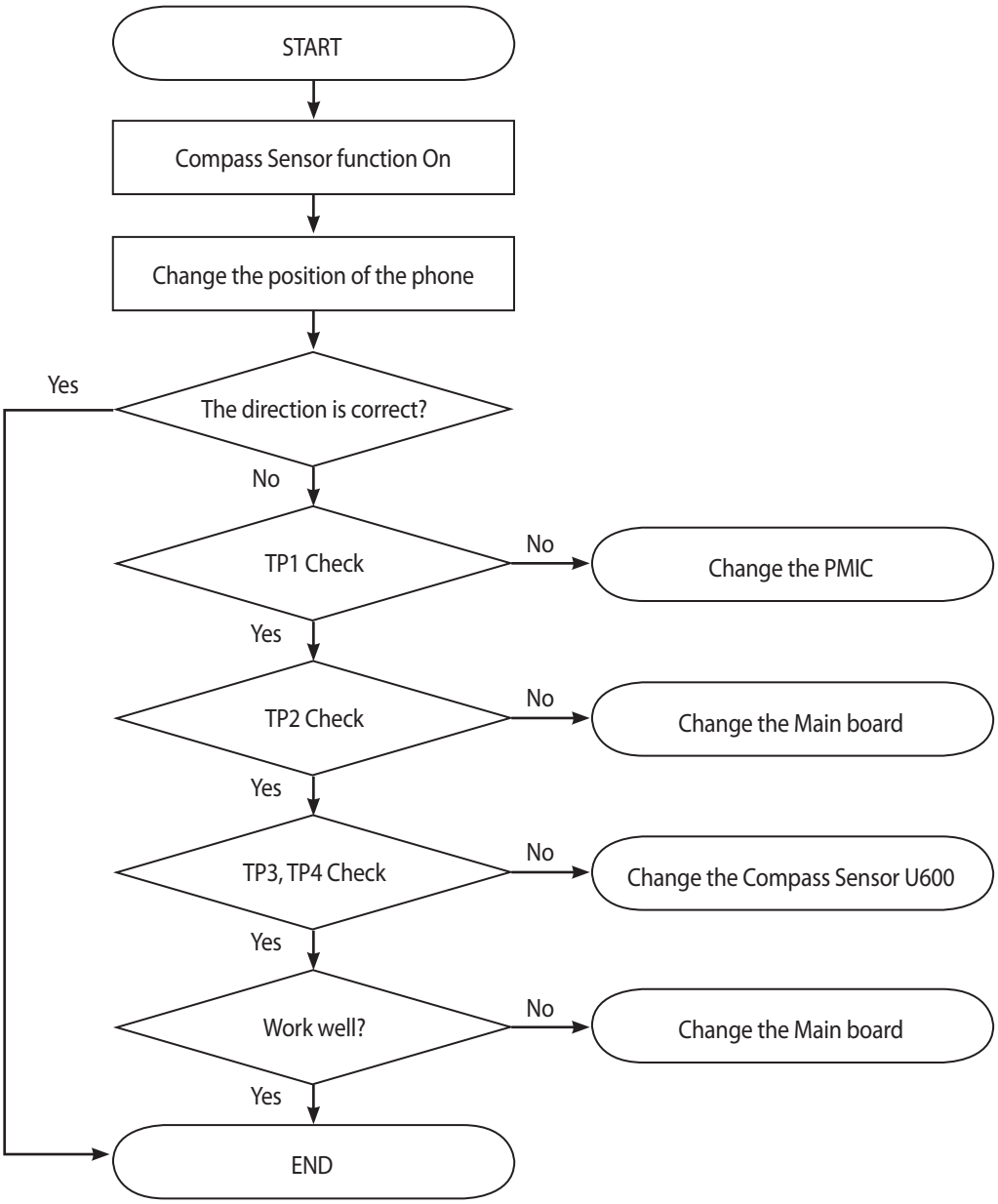




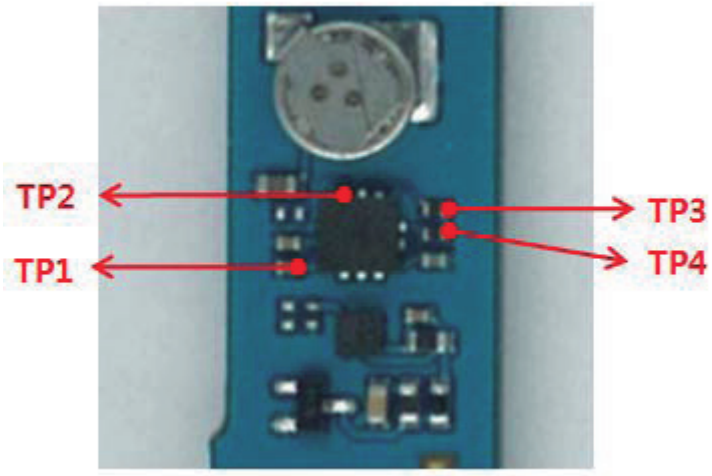
4.13 Compass Sensor on/off trouble shooting

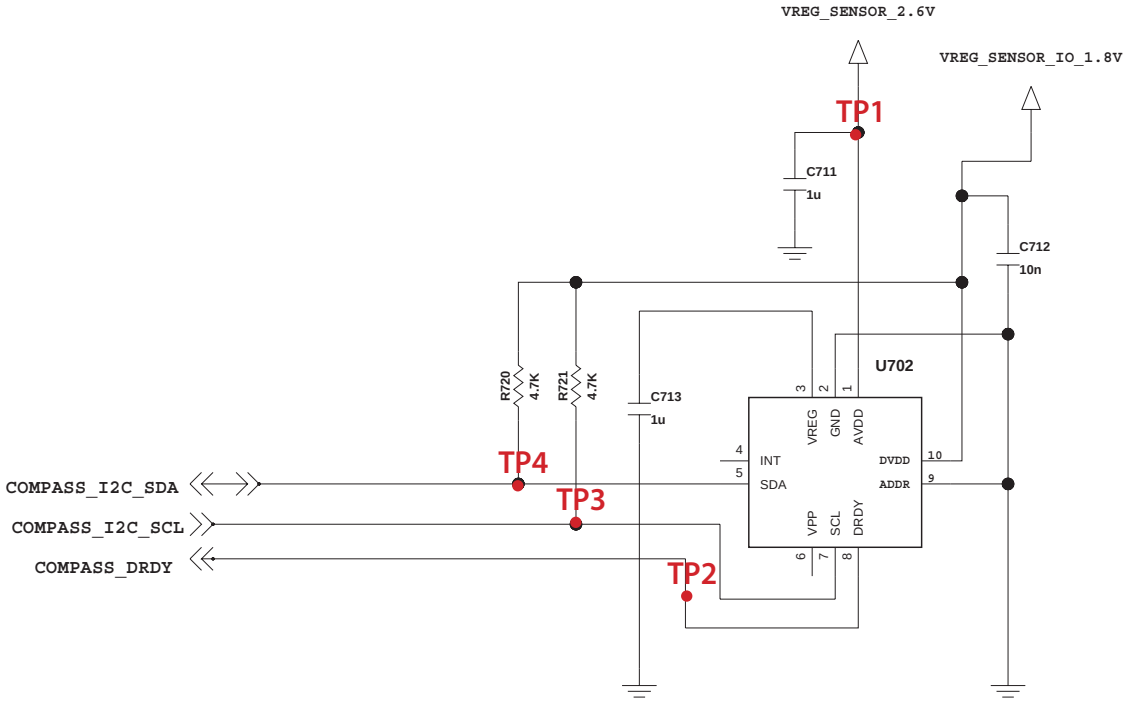
Compass Sensor is worked as below :

Compass Sensor function On



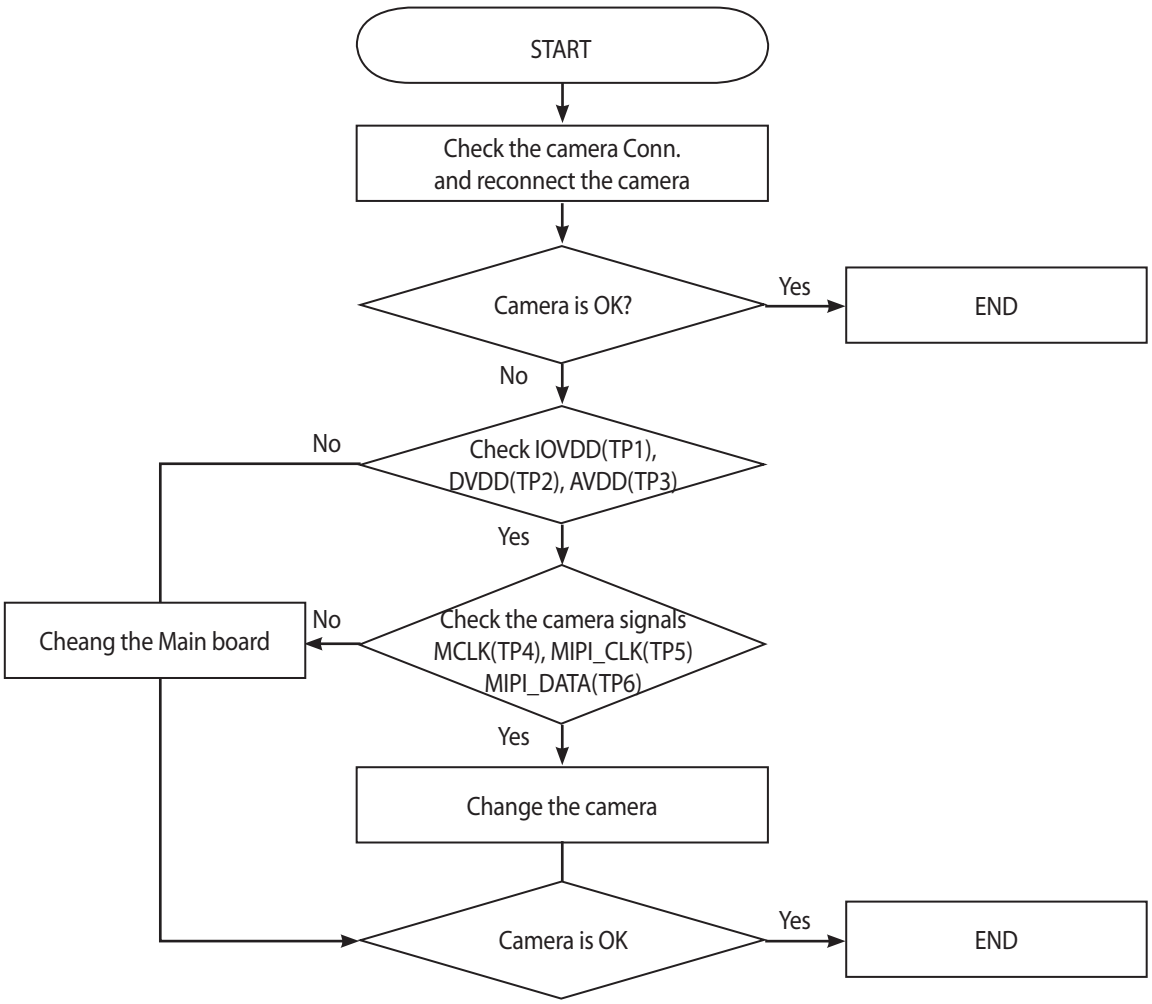
Measurement
VREG_SENSOR_2.6V(TP1)
COMPASS_DRDY(TP2)
COMPASS_I2C_SCL(TP3)
COMPASS_I2C_SDA(TP4)

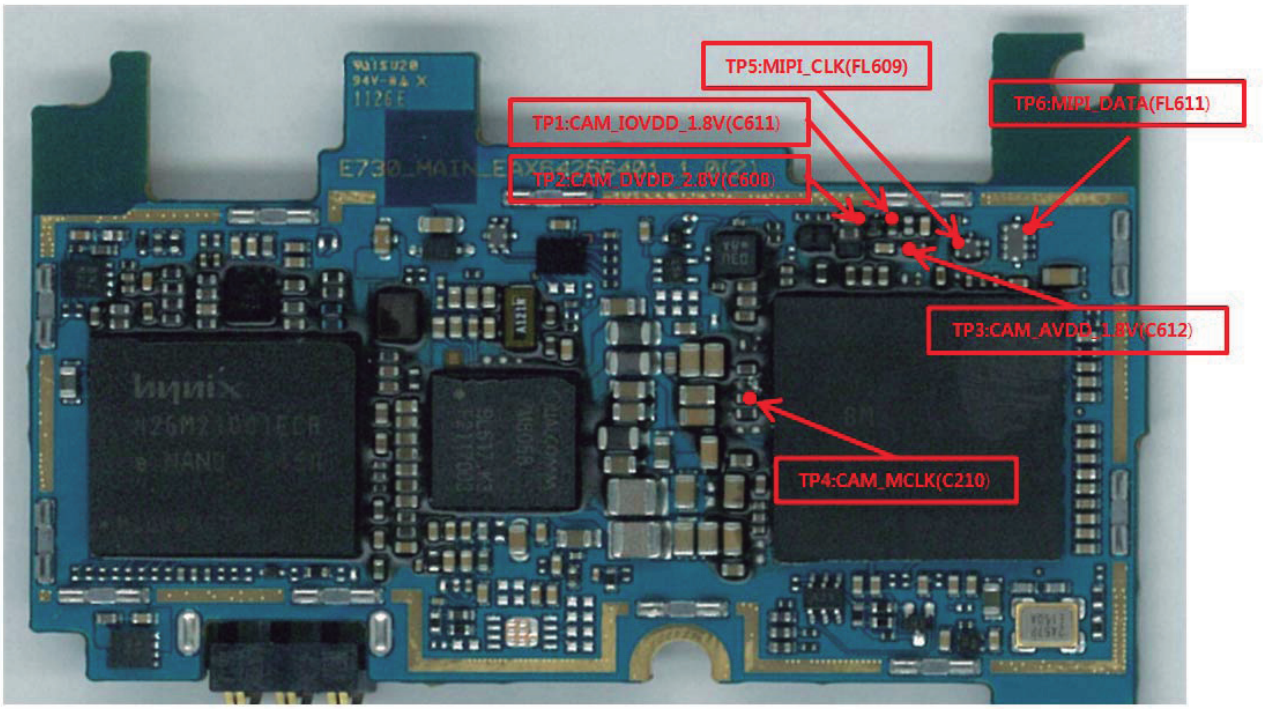


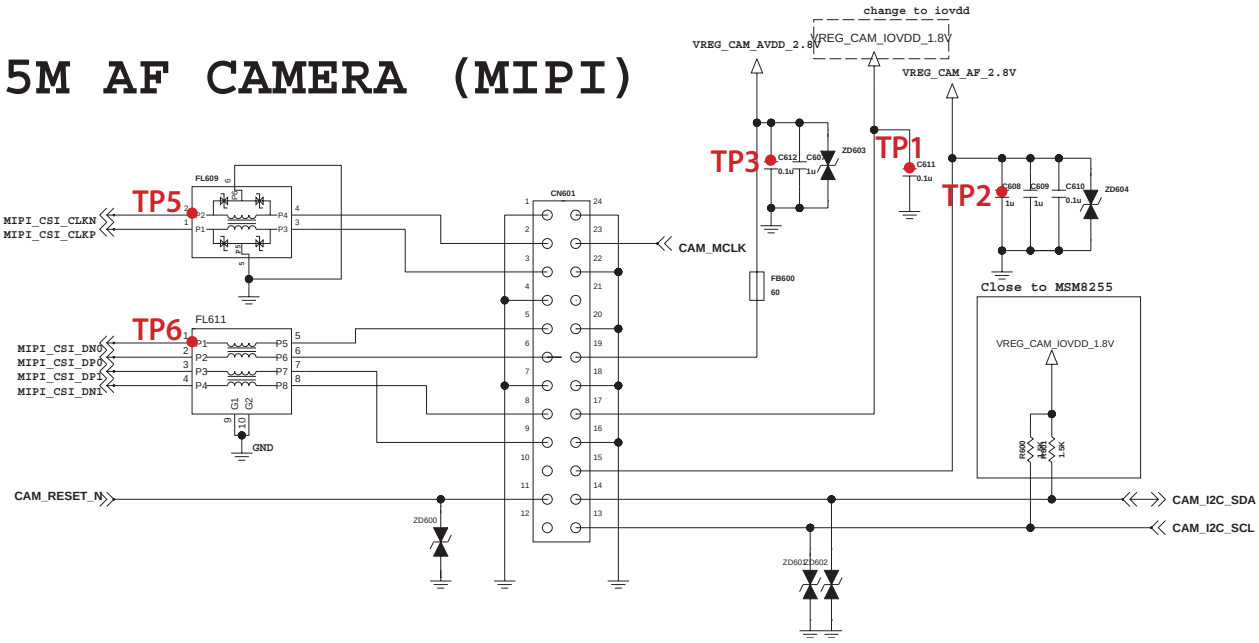


4.14 Camera troubleshooting

5M camera control signals are generated by MSM8255(U201), and Power is supplied by PM8058(U403)

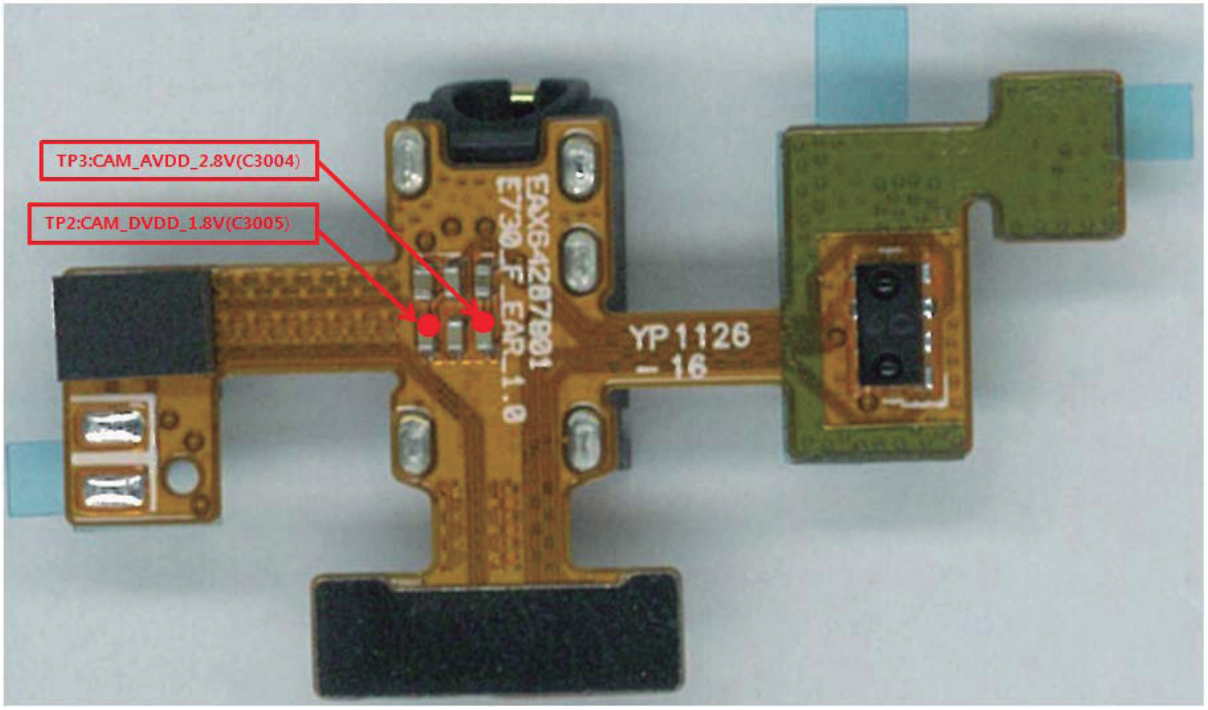


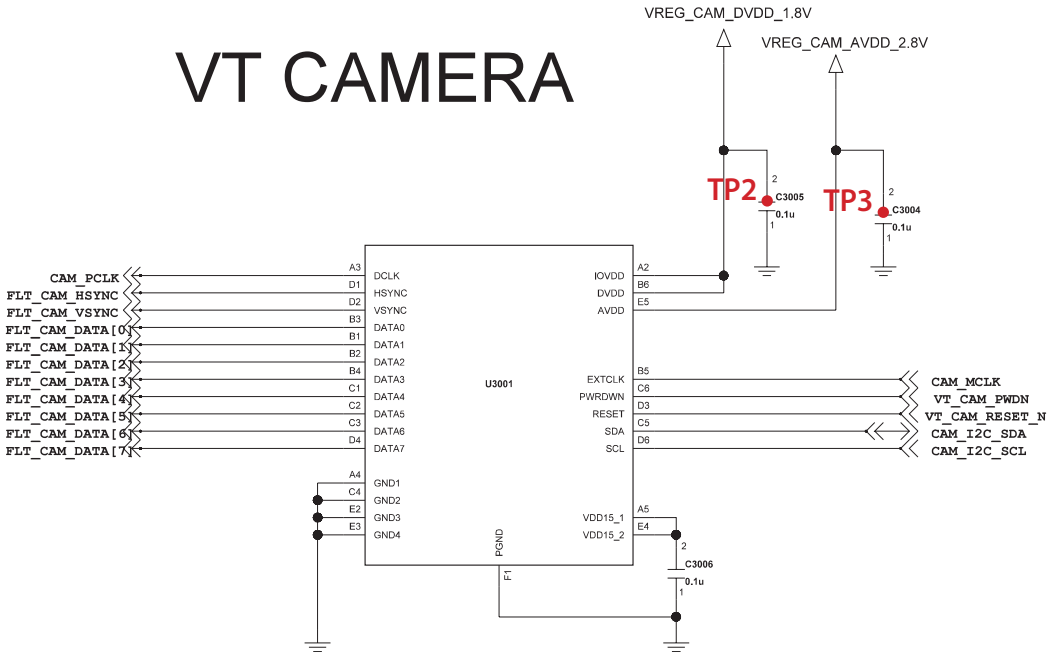




4.14.1 VGA Camera troubleshooting

VGA camera control signals are generated by MSM8255(U201), and Power is supplied by PM8058(U403)

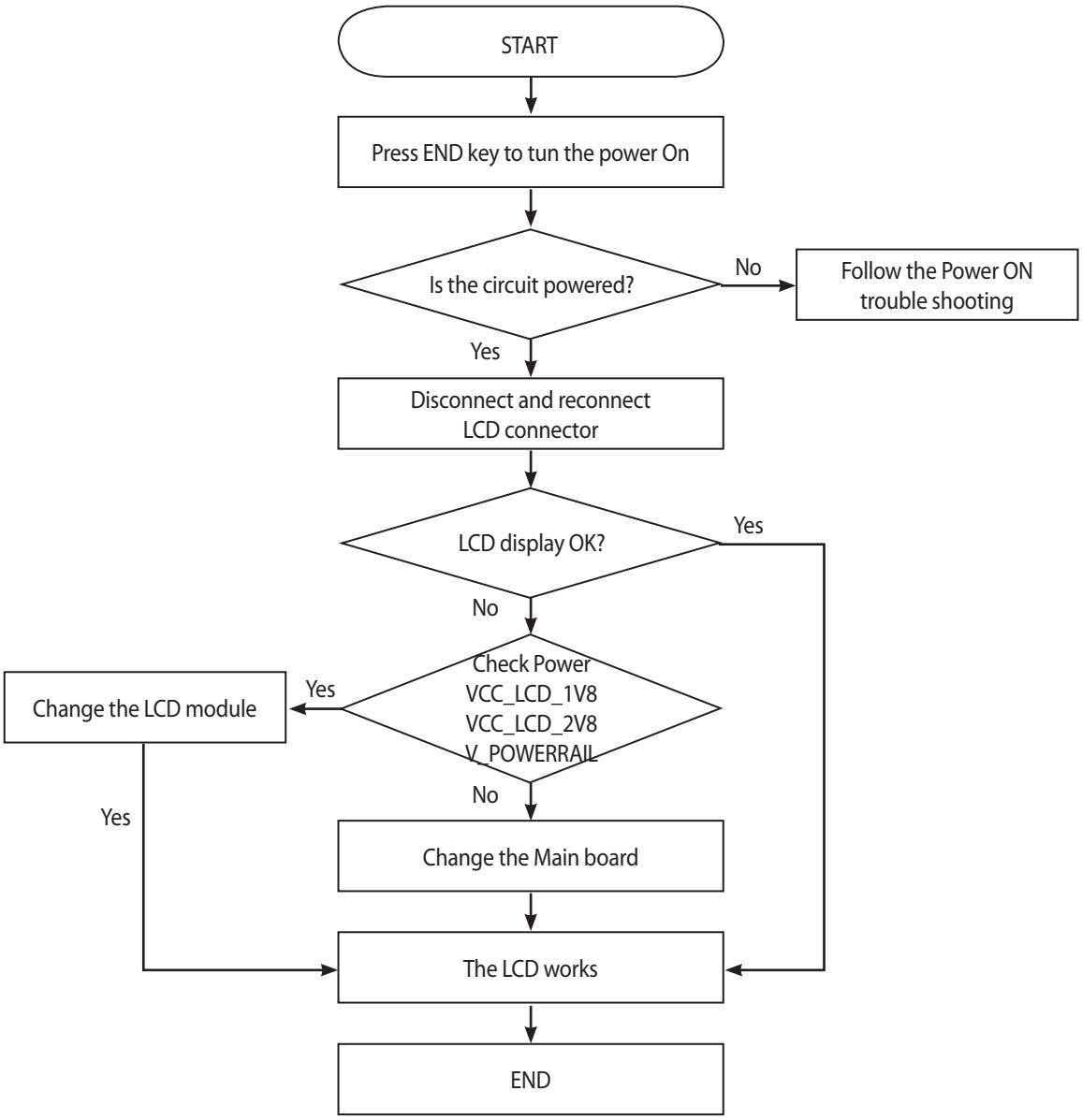


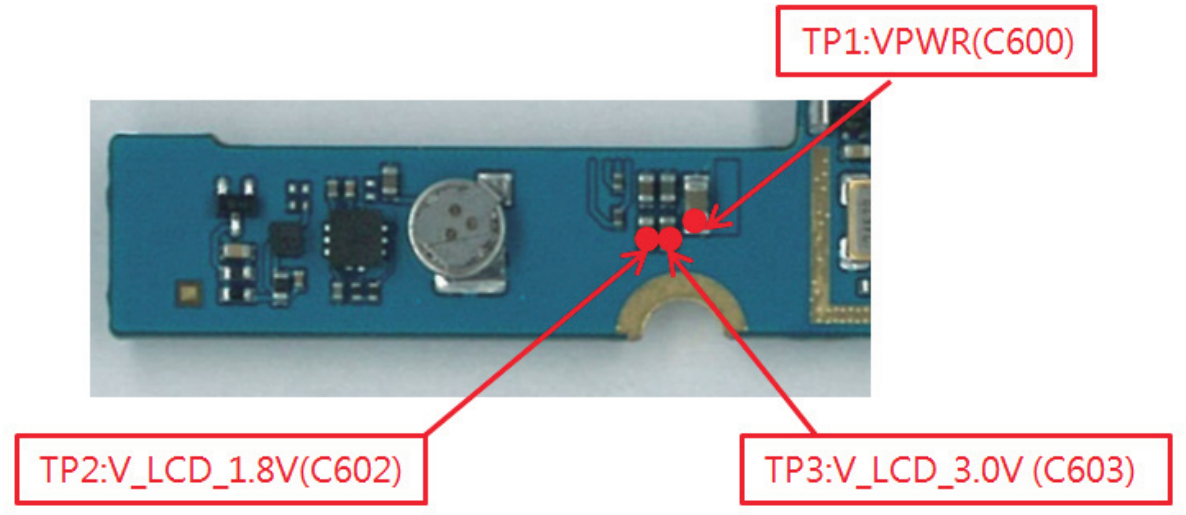


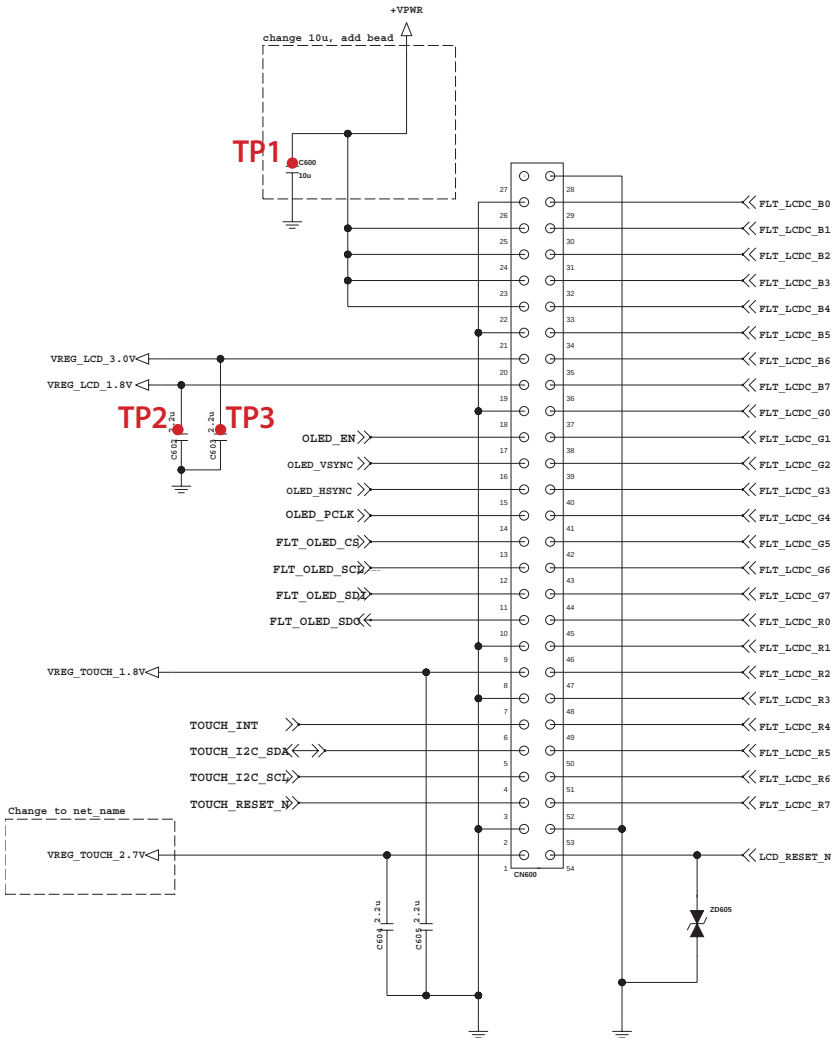
4.15 Main LCD trouble

Main LCD control signals are generated by MSM8255(U201). Those signal's path are :

MSM8255-> LCD Module





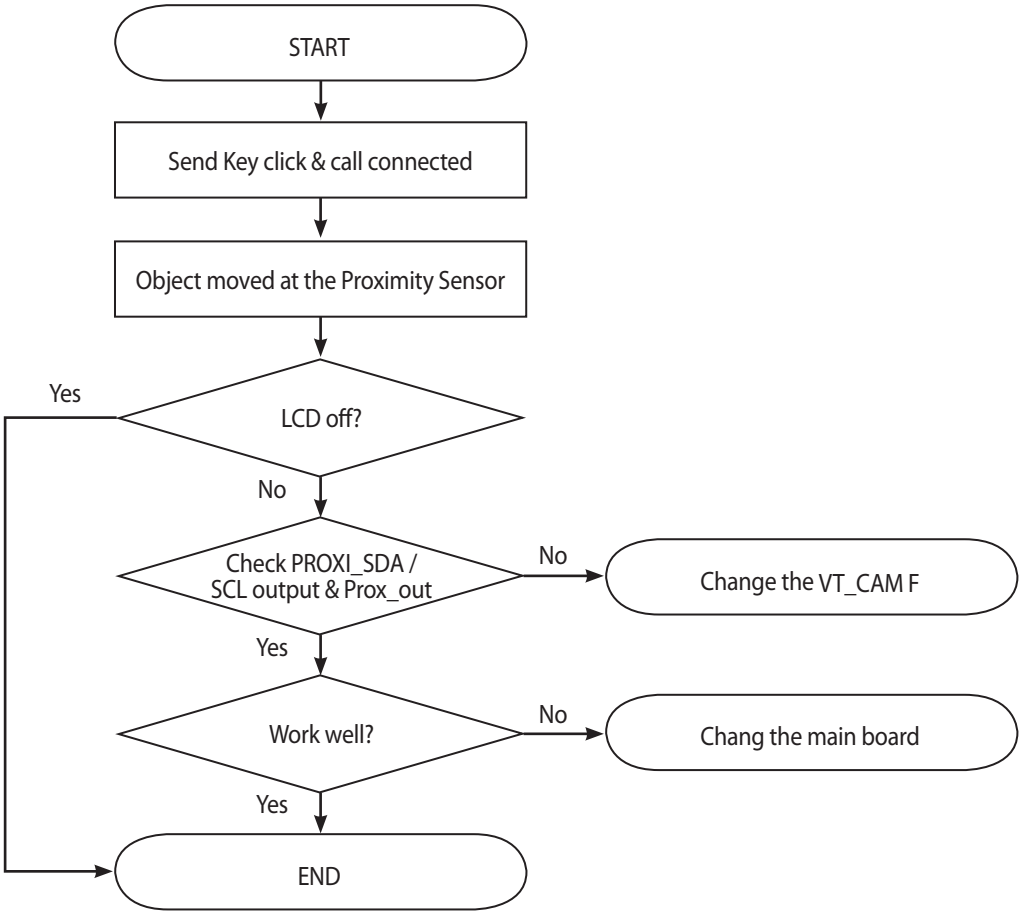


4.16 Proximity Sensor on/off trouble

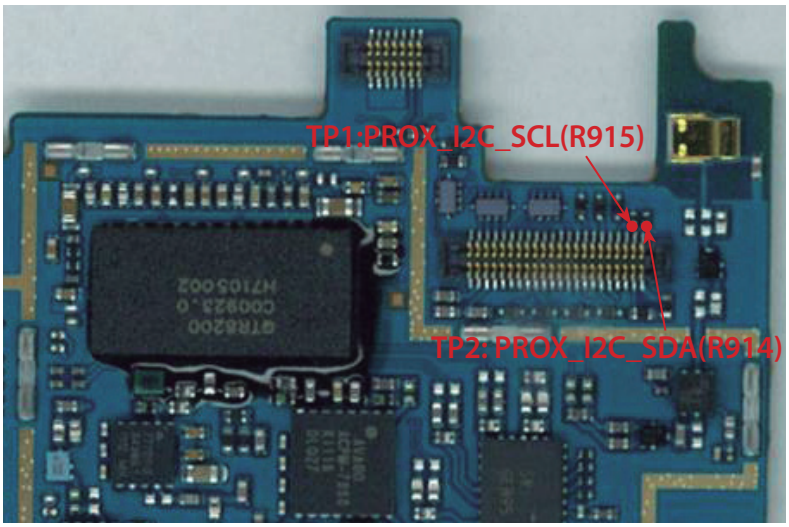
Proximity Sensor is worked as below :

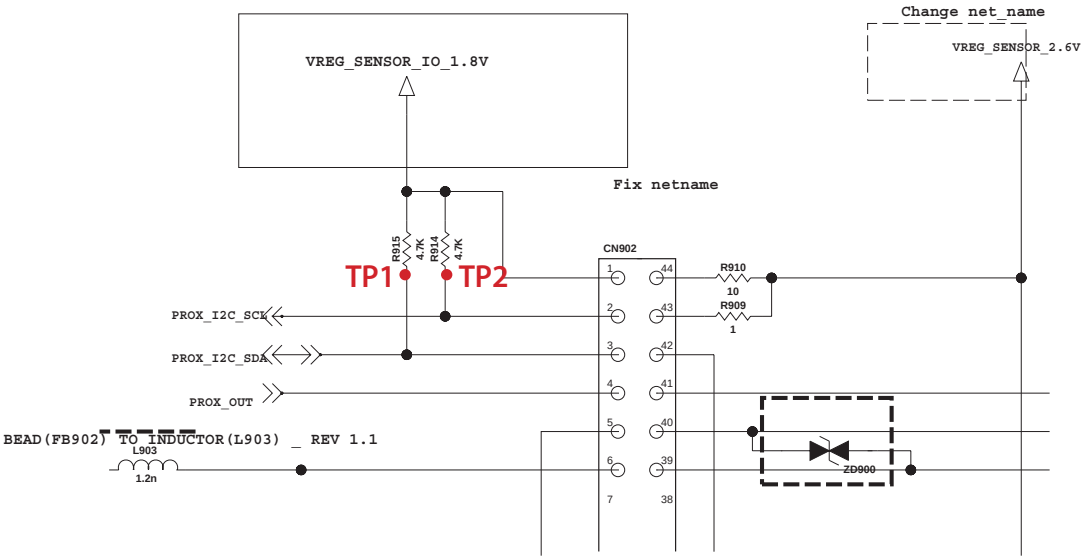
Send Key click → Phone number click → Call connected → Object moved at the sensor →

Control the screen's on/off operation automatically



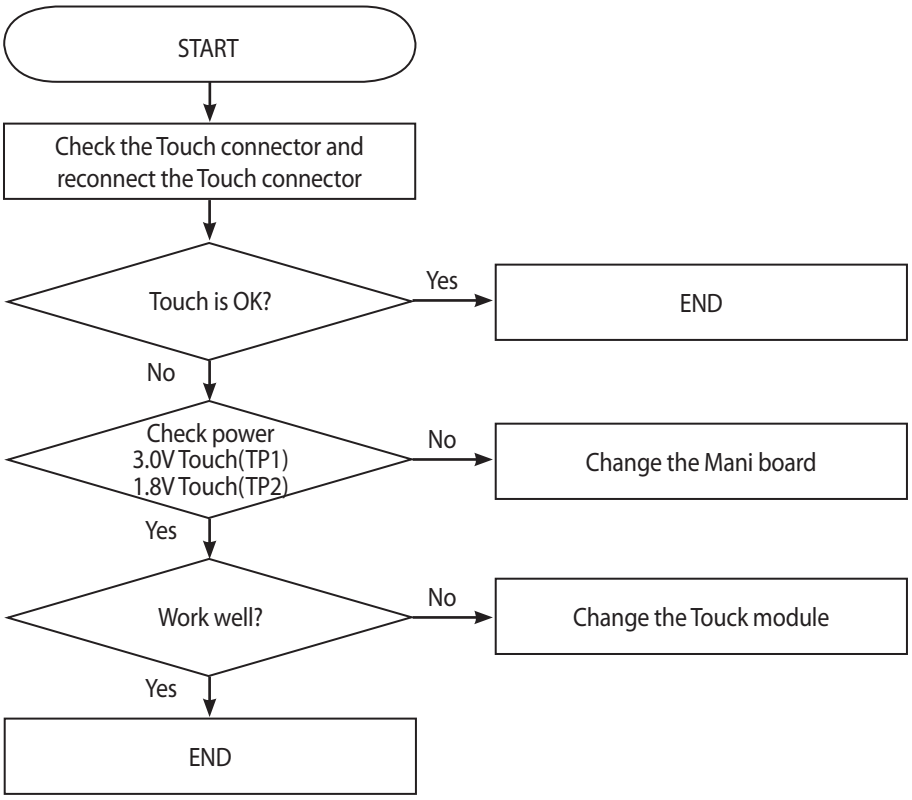
Measurement
I2C3_SCL
I2C3_SDA



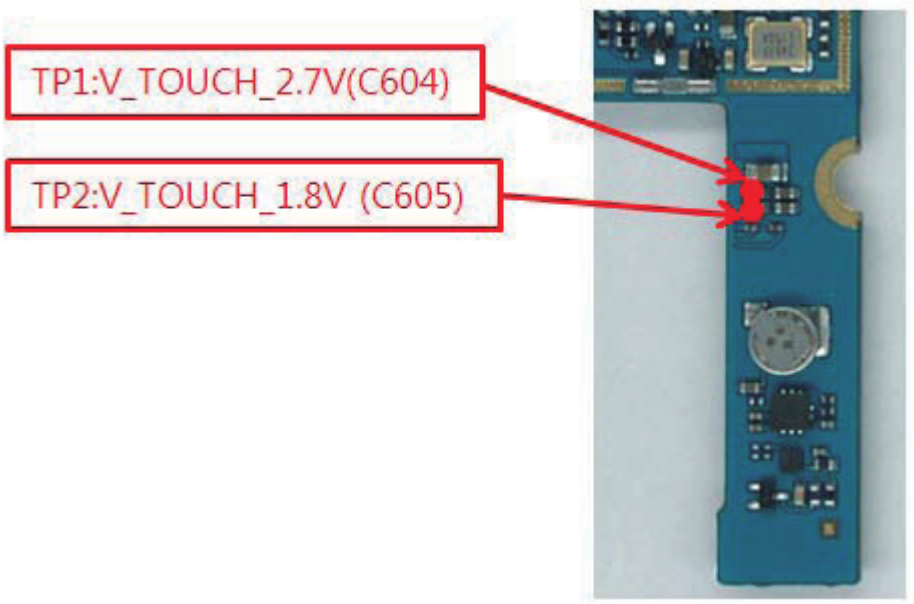


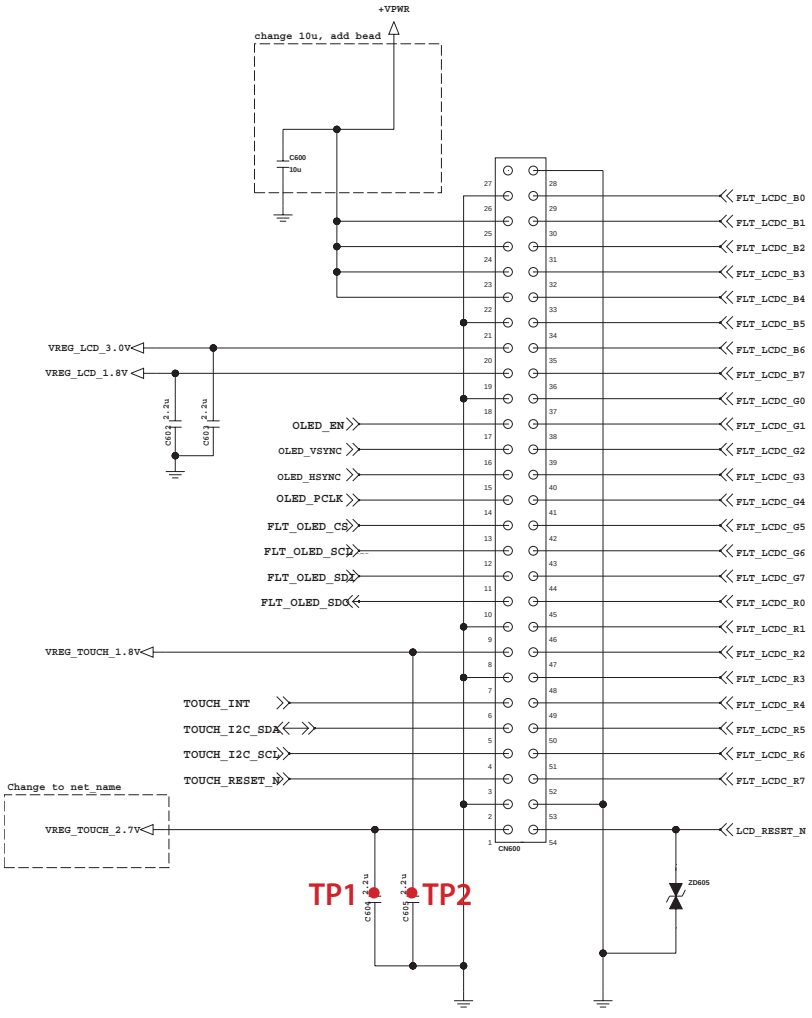
4.17 Touch trouble

Touch control signals are generated by AP20. Those signal's path are : AP20 → Touch Module



Measurement
3.0V TOUCH (TP1)
1.8V TOUCH (TP2)

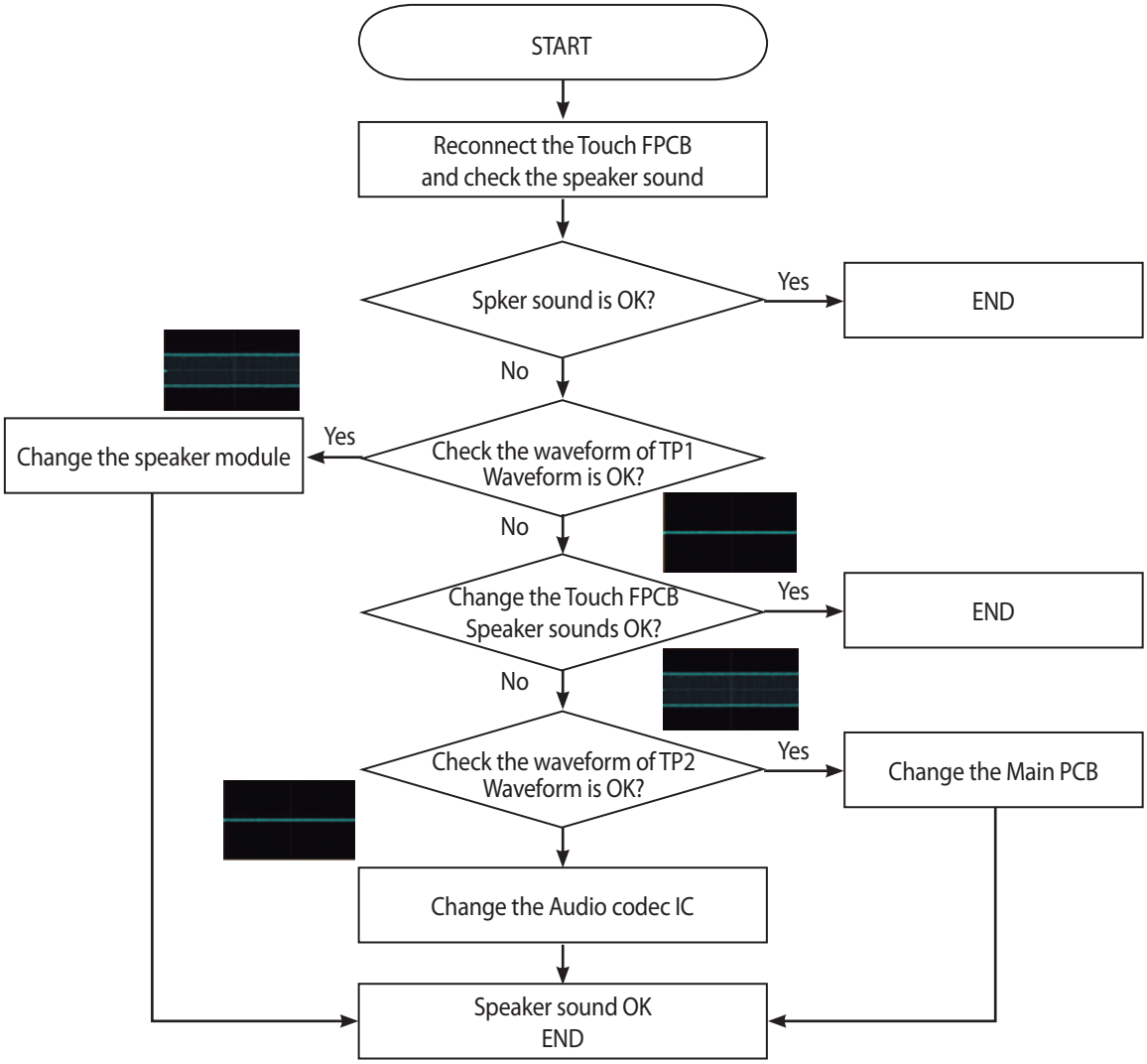


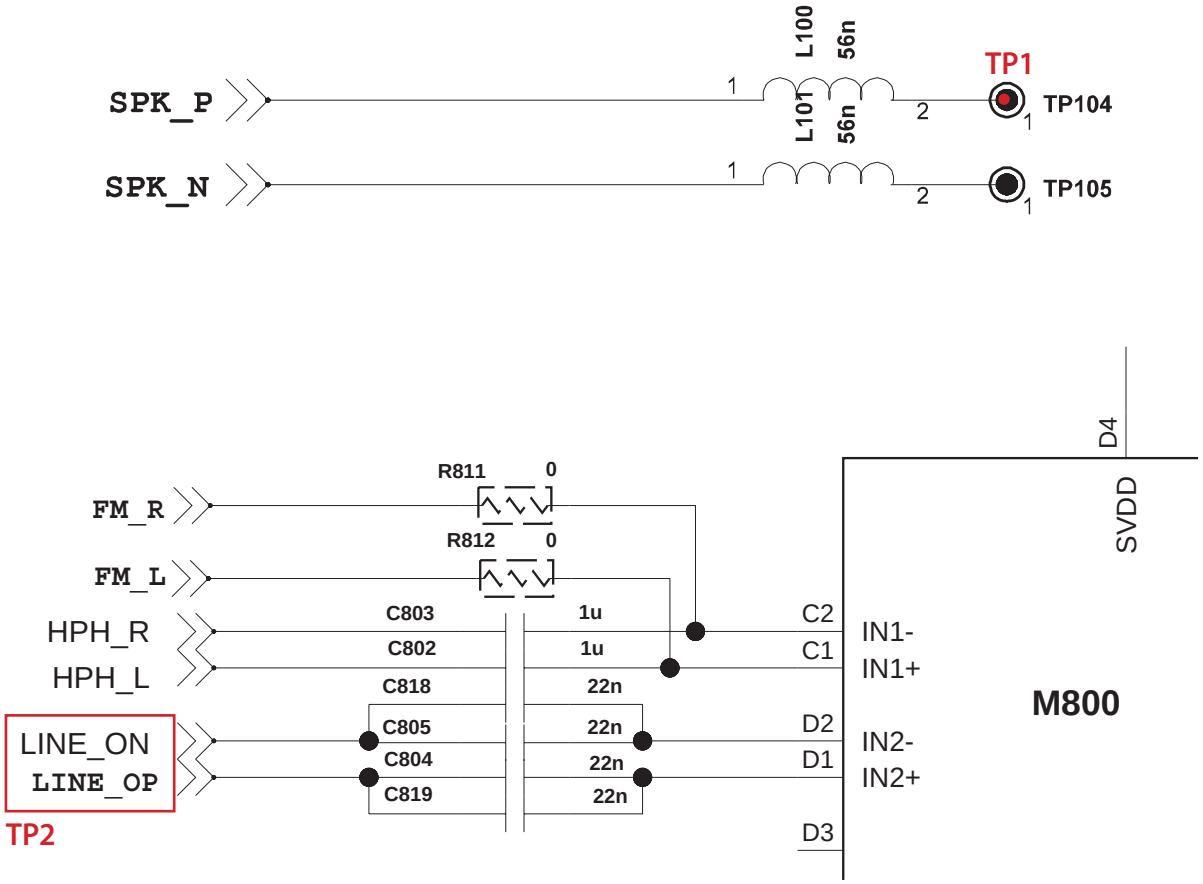


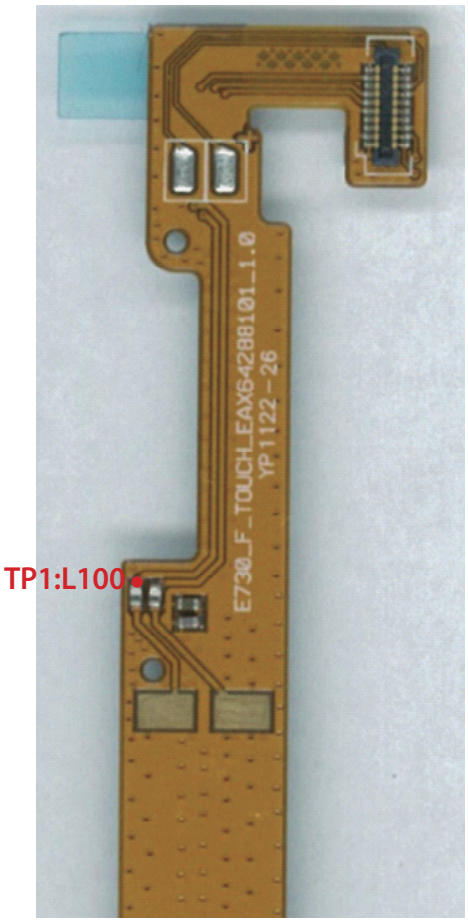
4.18 Audio trouble

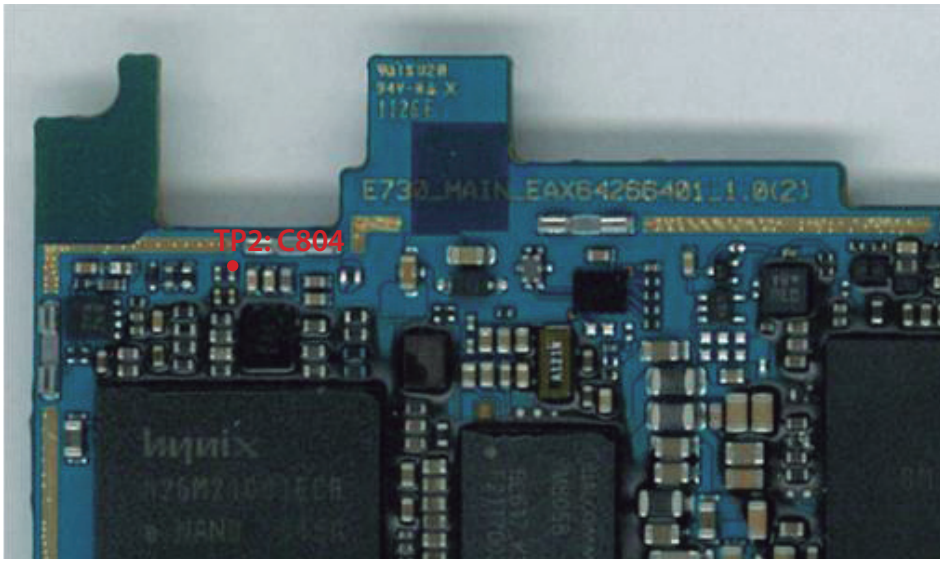
4.18.1 Speaker trouble

Speaker control signals are generated by QTR8200 (U1001), amplified by WM9093 (M800), and Power is supplied by Battery (VBAT).



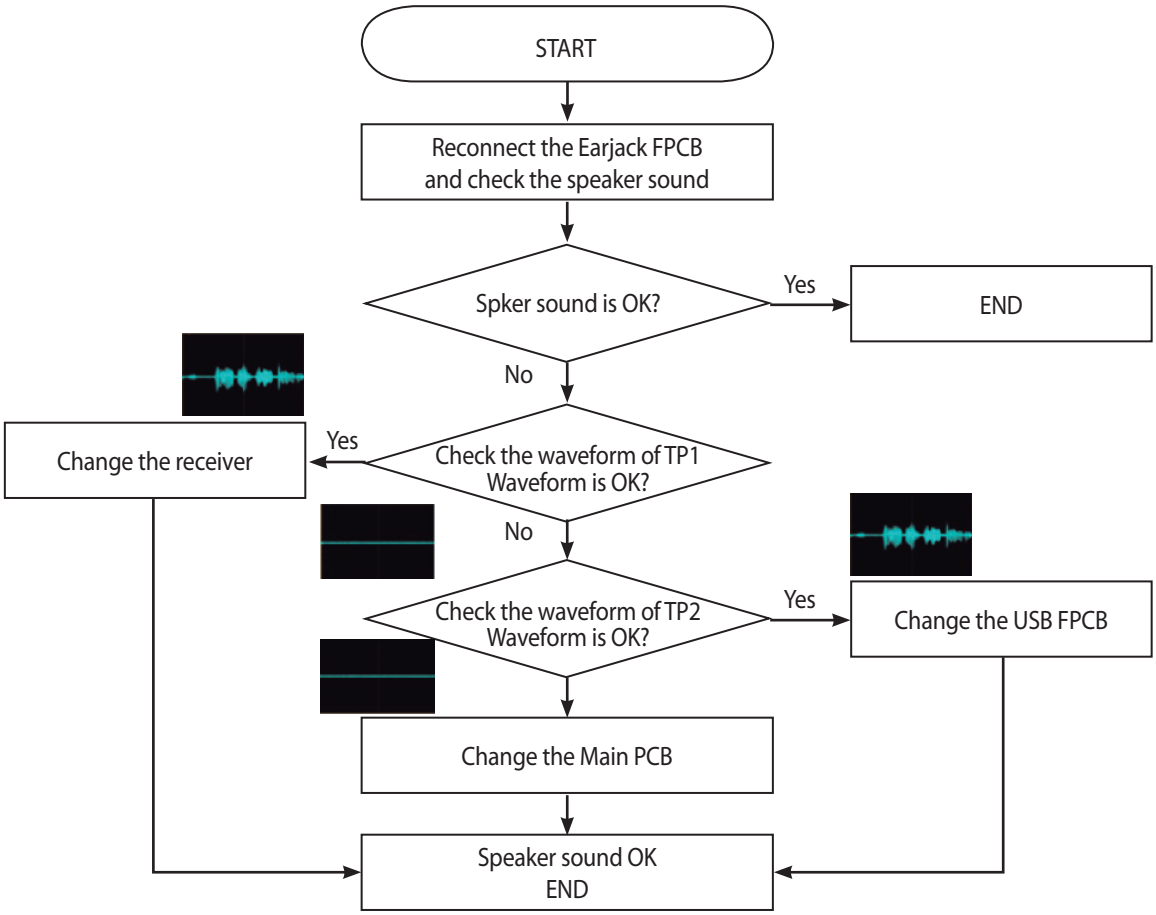


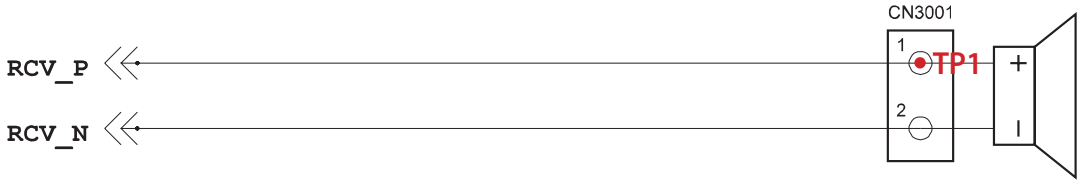


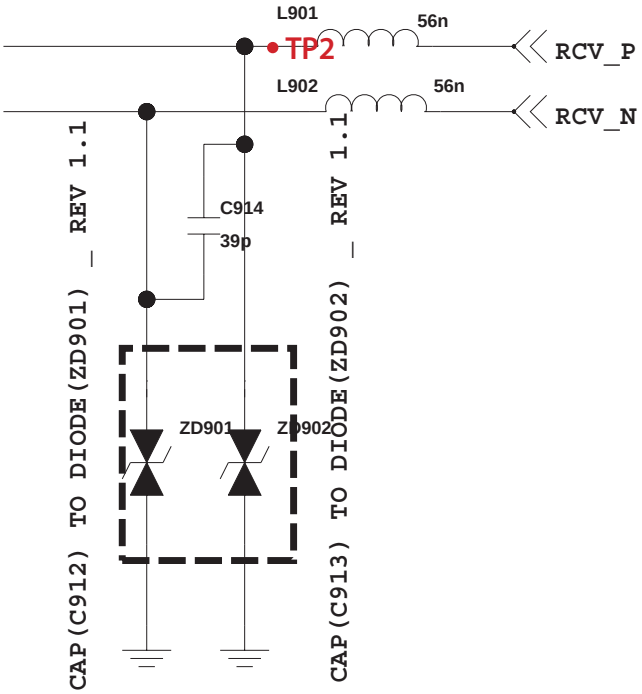


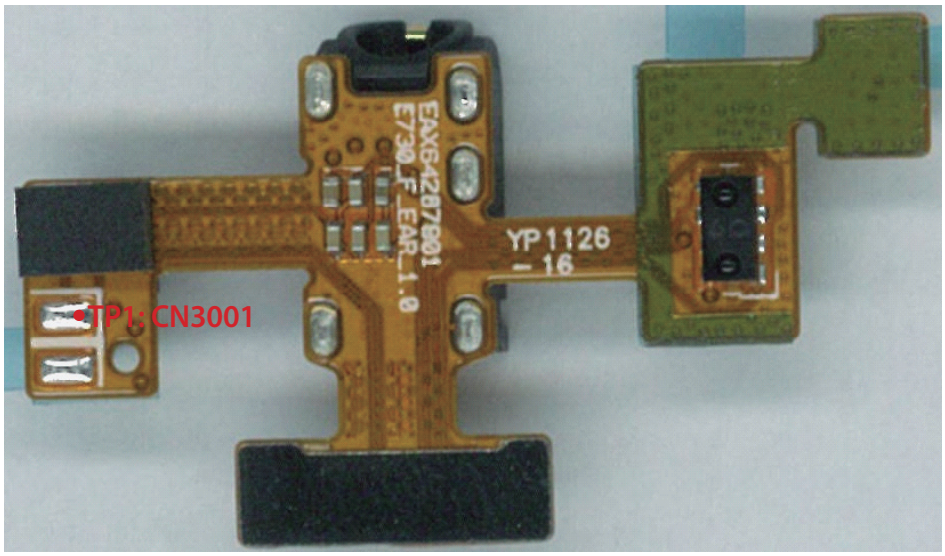
4. 18.2 Receiver trouble

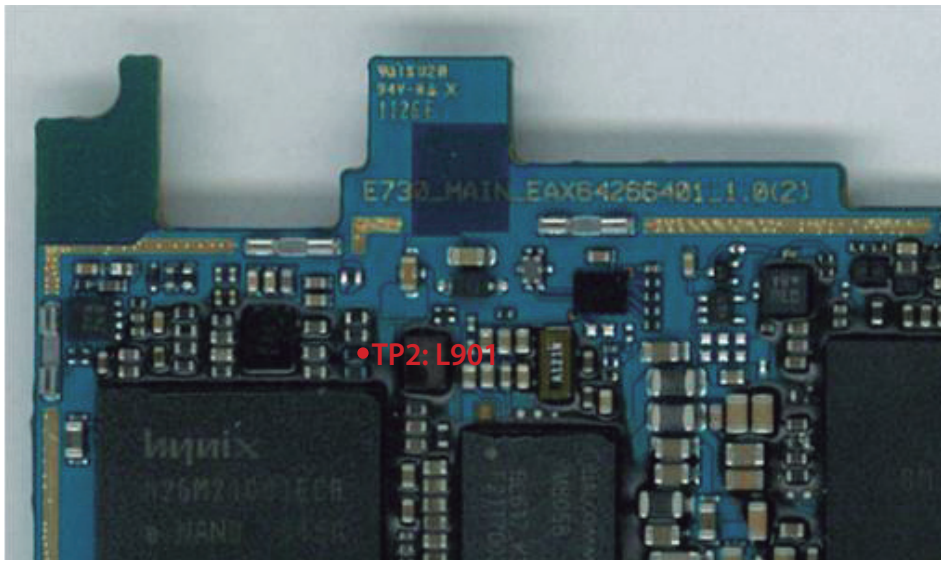
Receiver control signals and power are generated by QTR8200 (U1001).





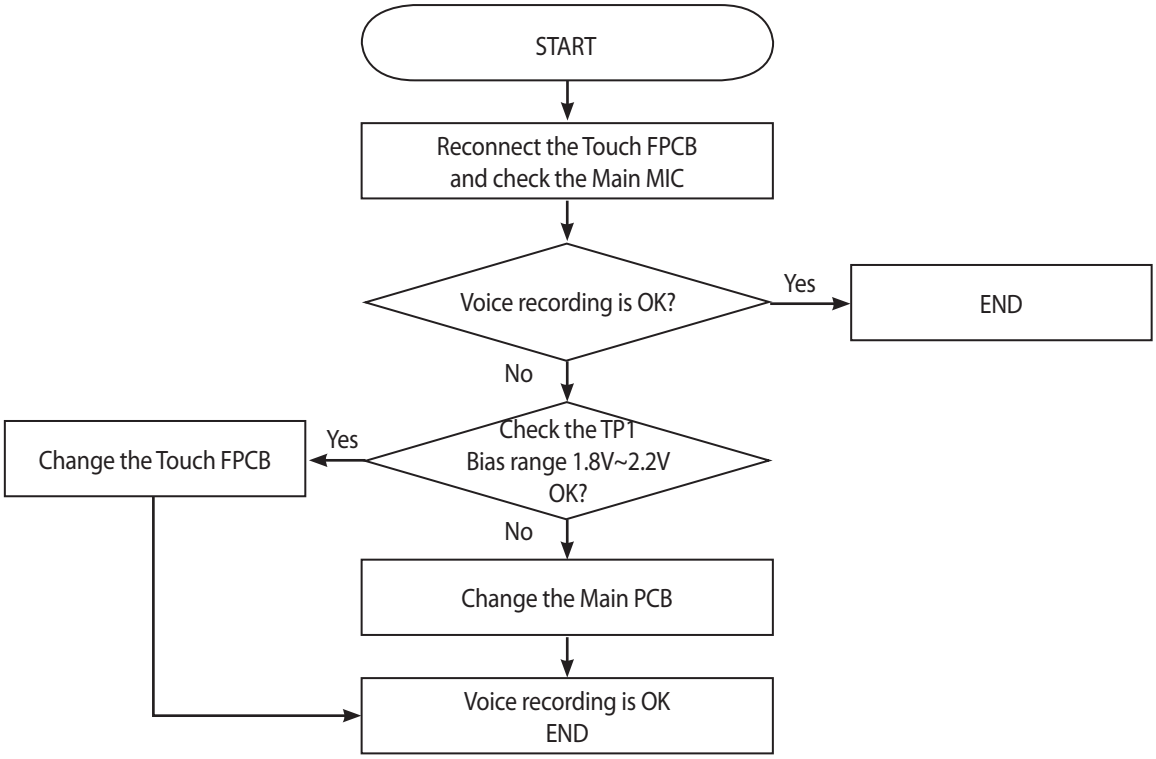


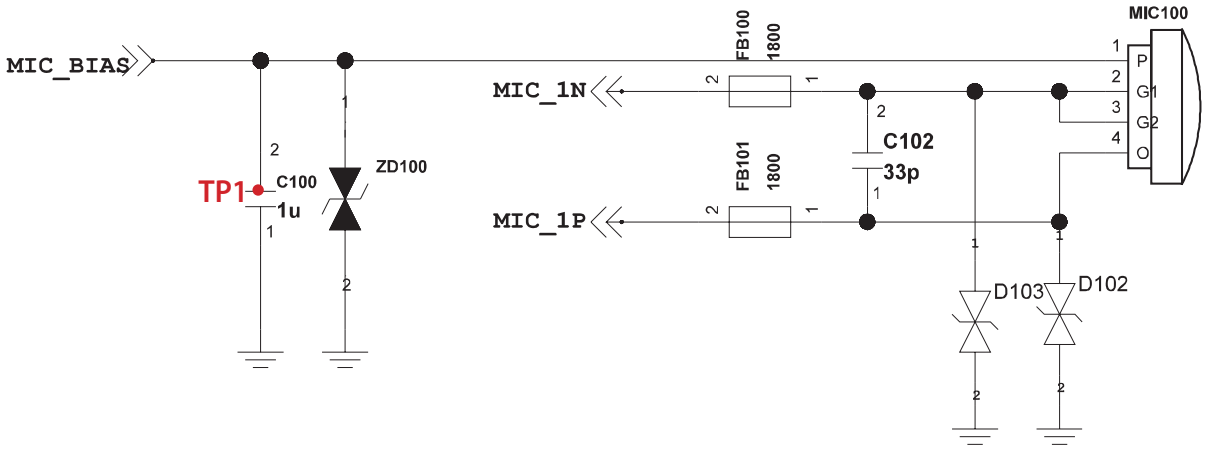


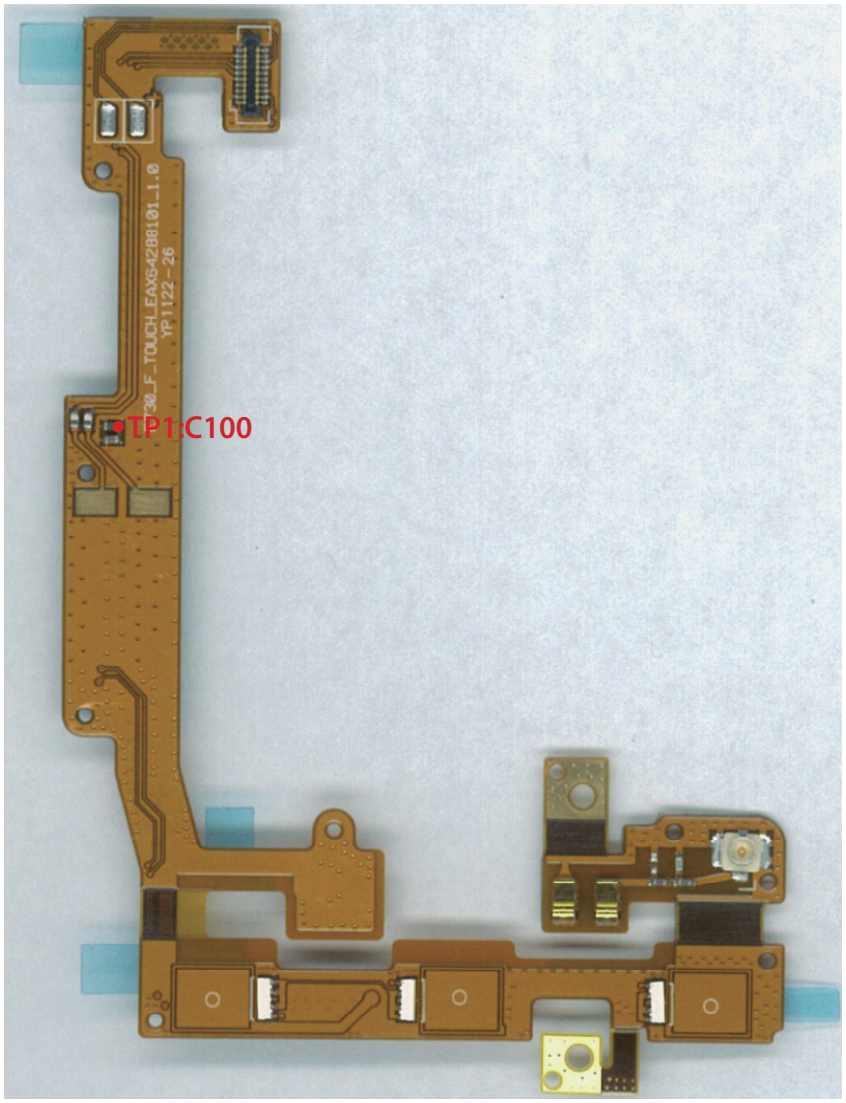


4.18.3 Main MIC trouble

Main MIC control signals and power are generated by QTR8200 (U1001).

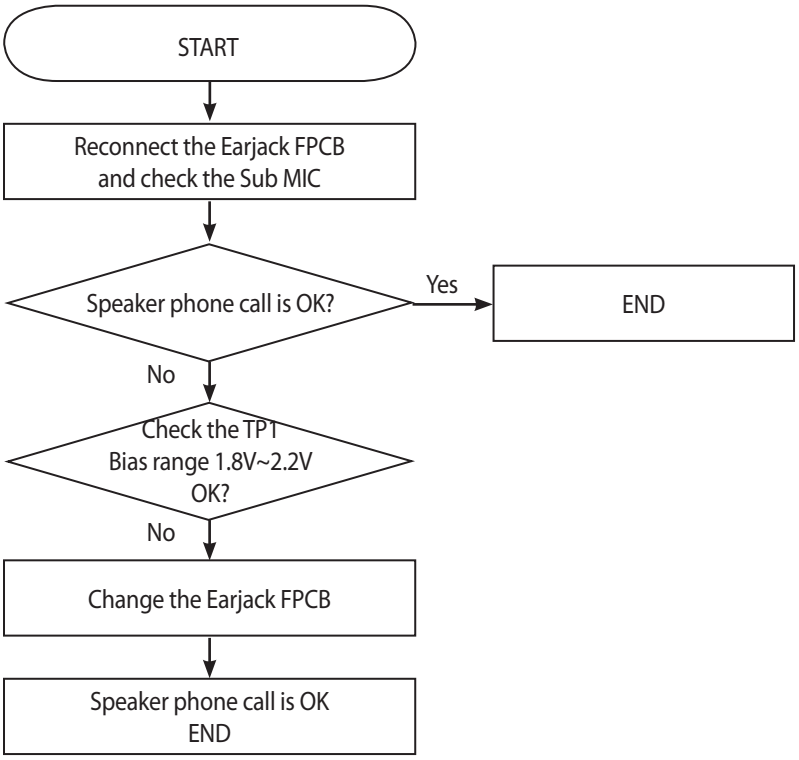


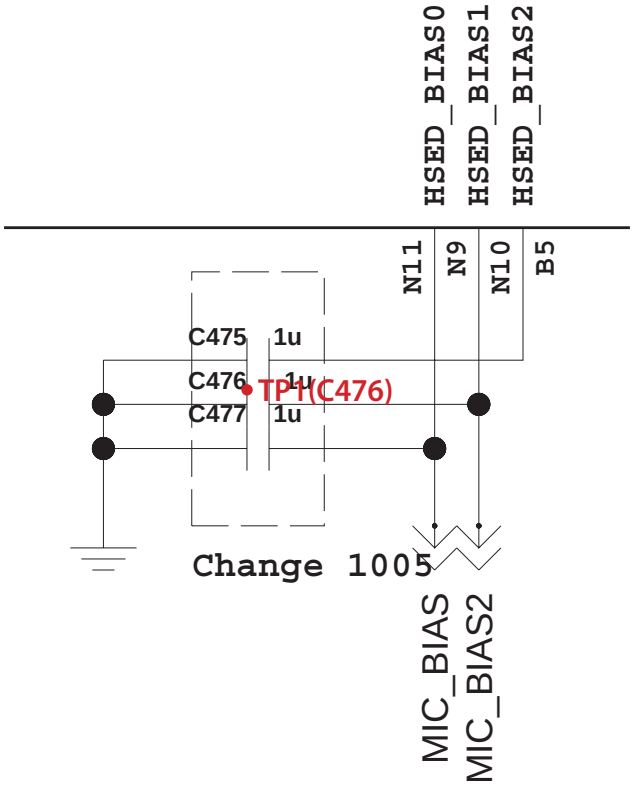


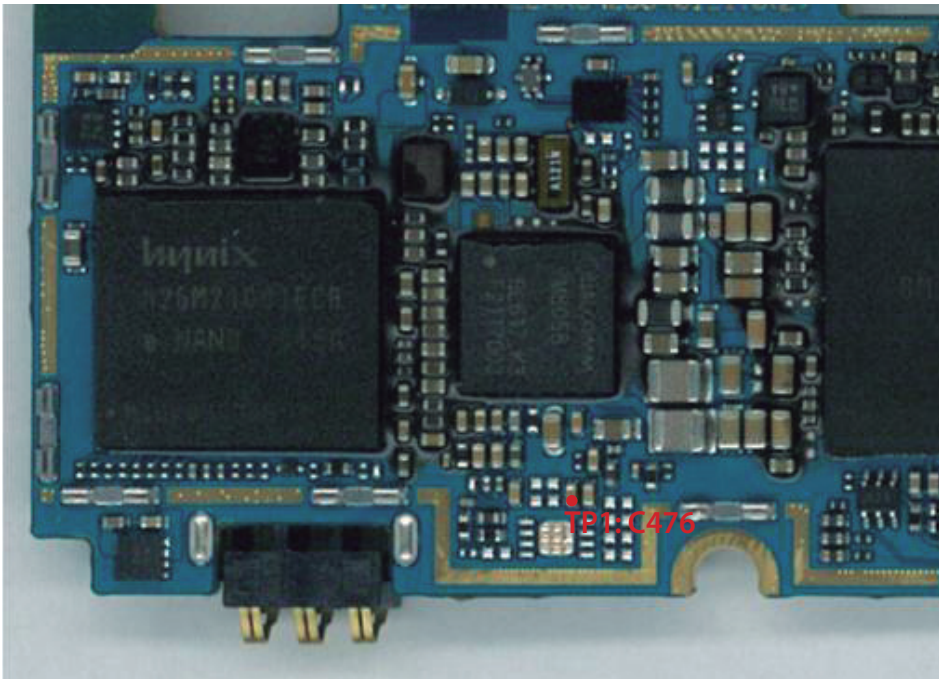


4.18.4 SUB MIC trouble

Sub MIC control signals and power are generated by QTR8200 (U1001).



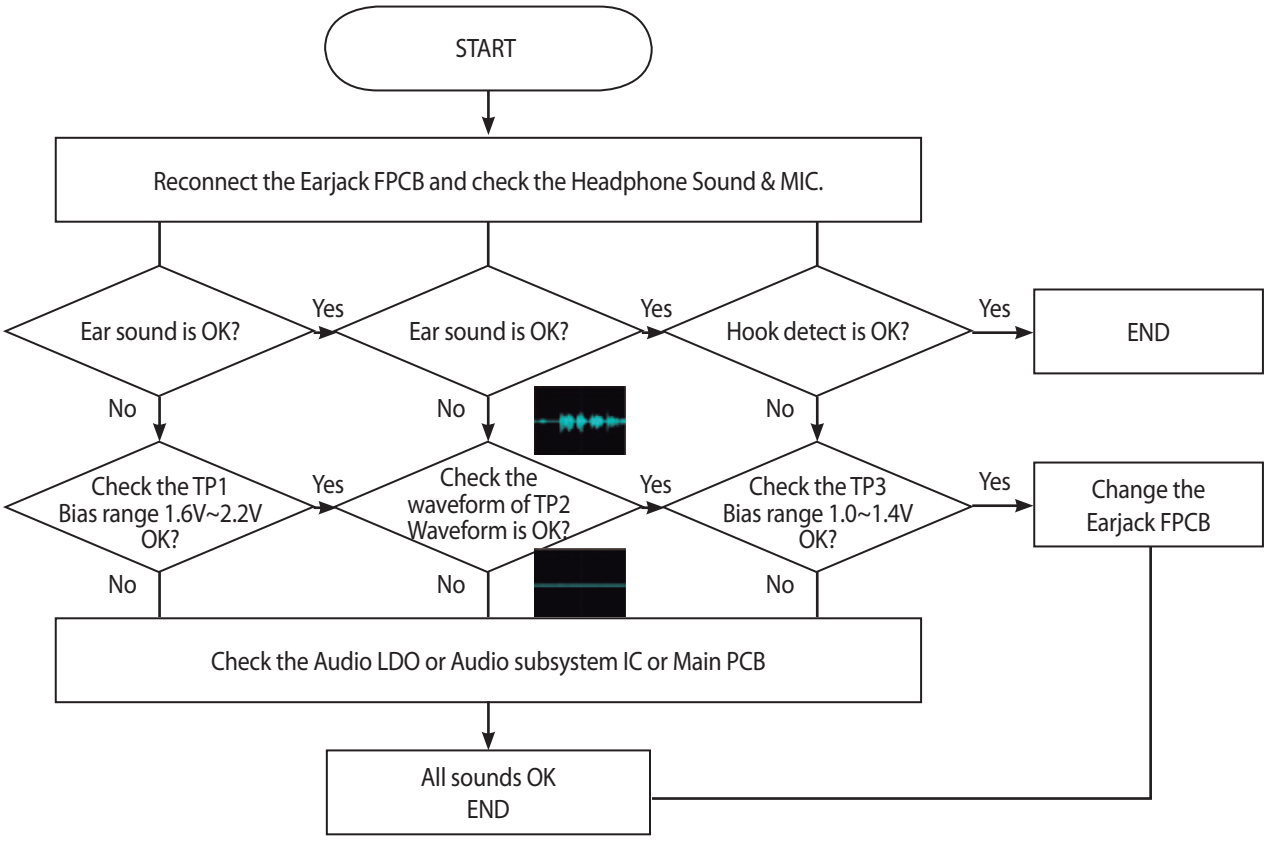


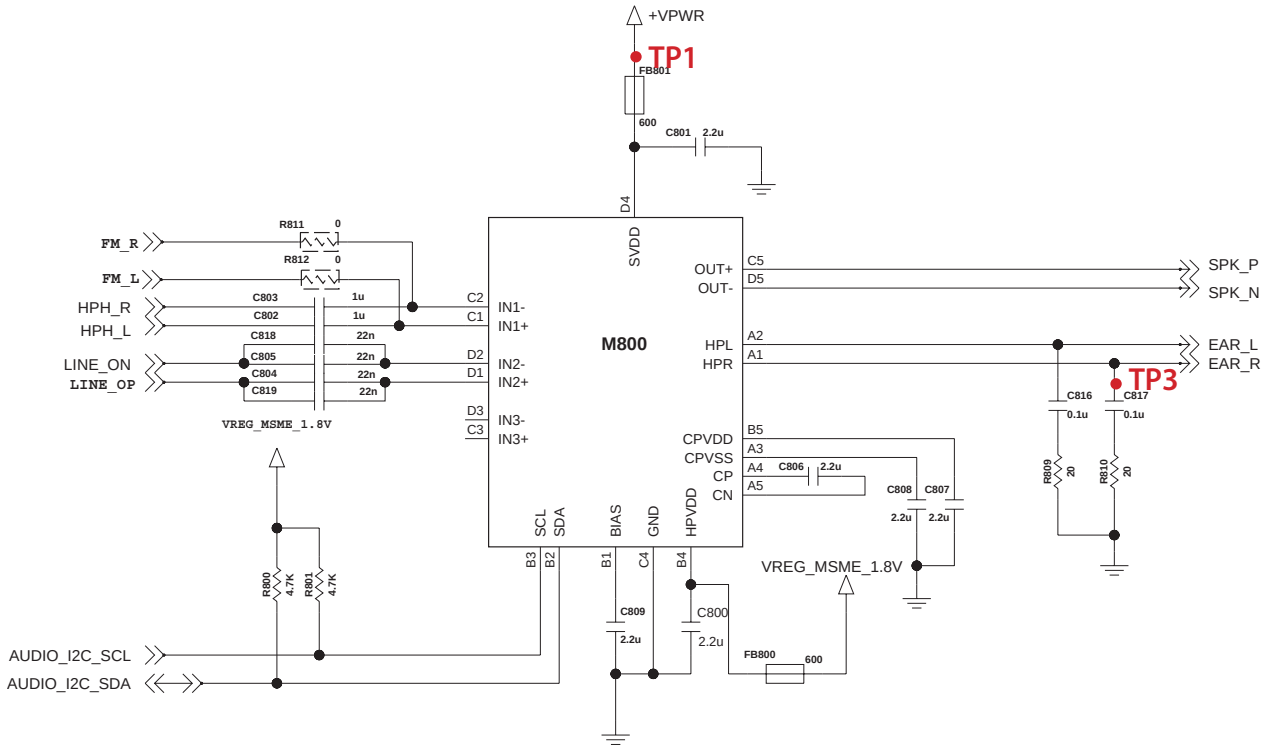


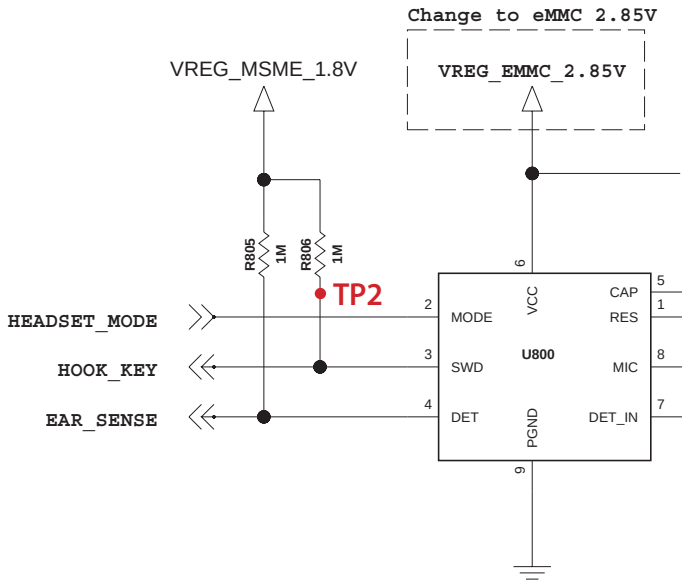
4.18.5 Ear-MIC trouble

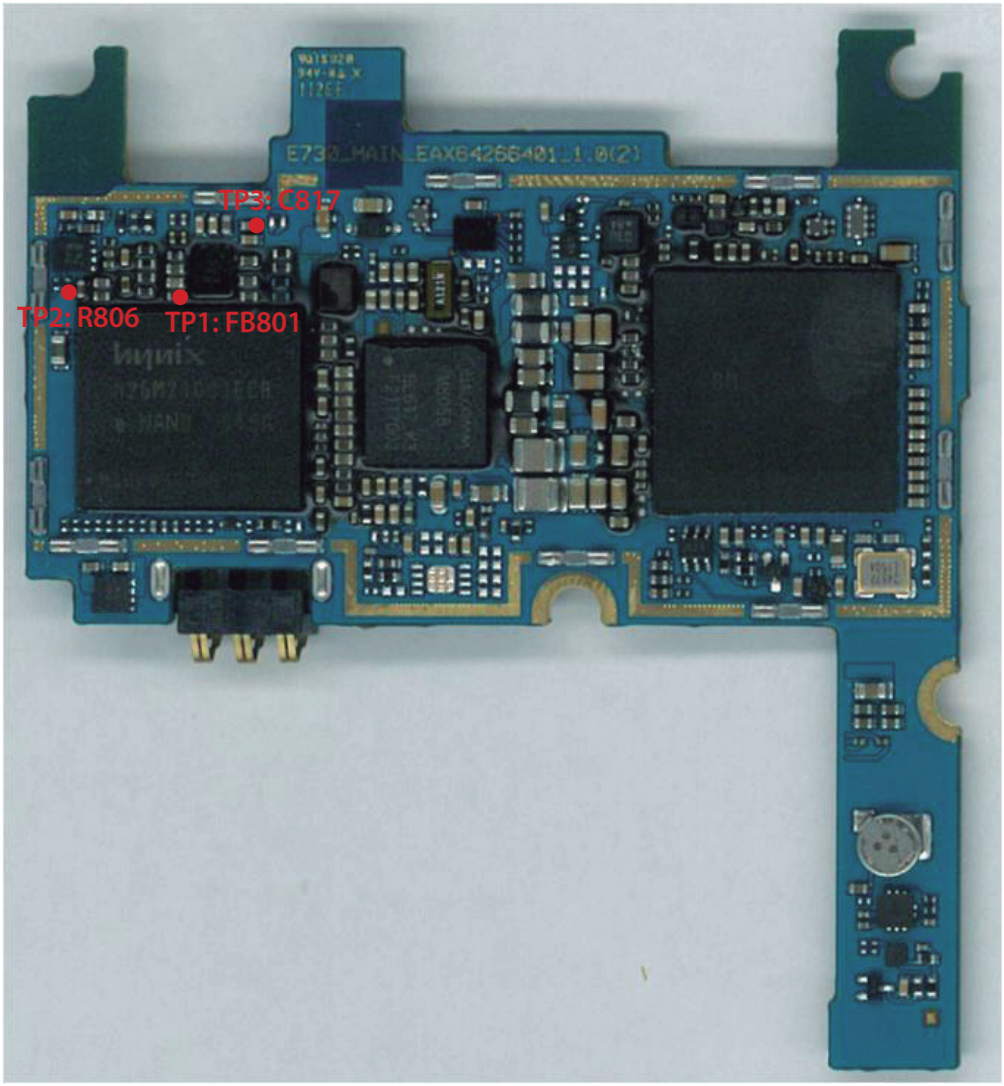
Ear MIC control signals are generated by QTR8200 (U1001). Amplified by WM9093 (M800).

The power is generated by PM8058(U403).

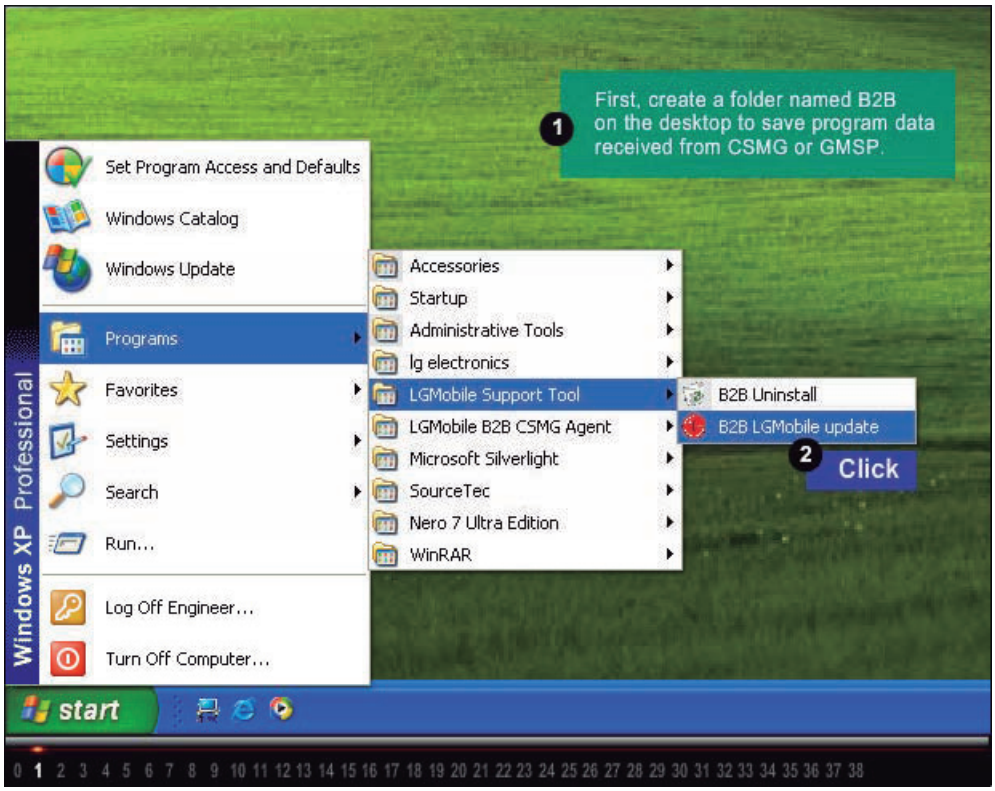


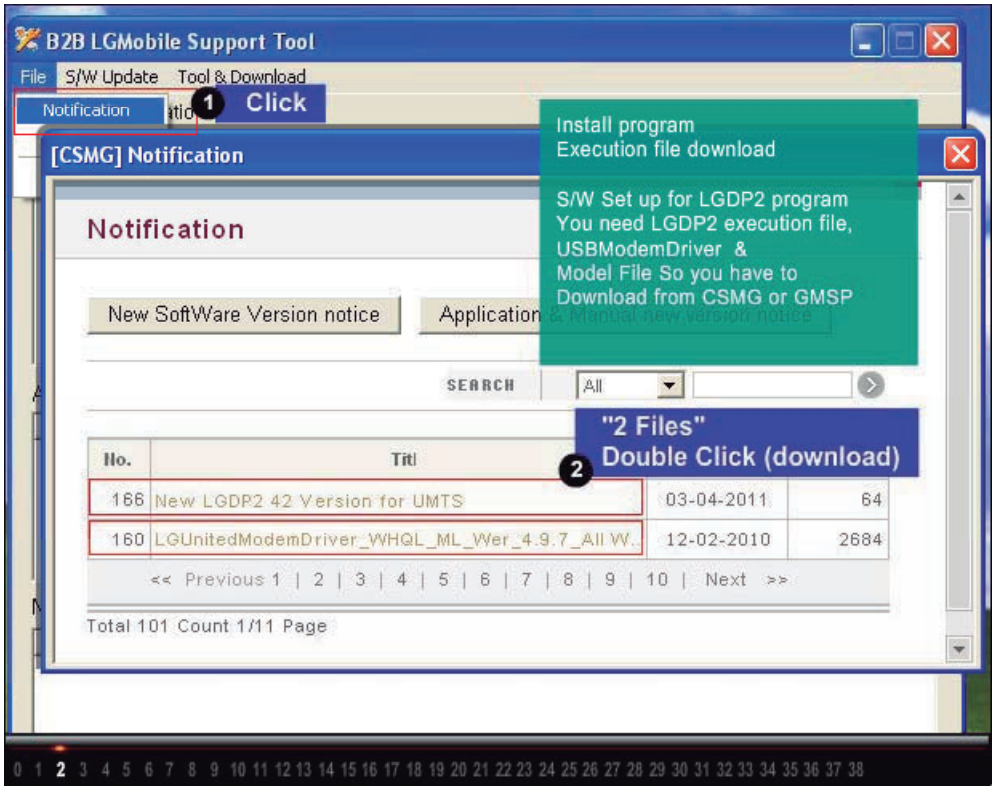


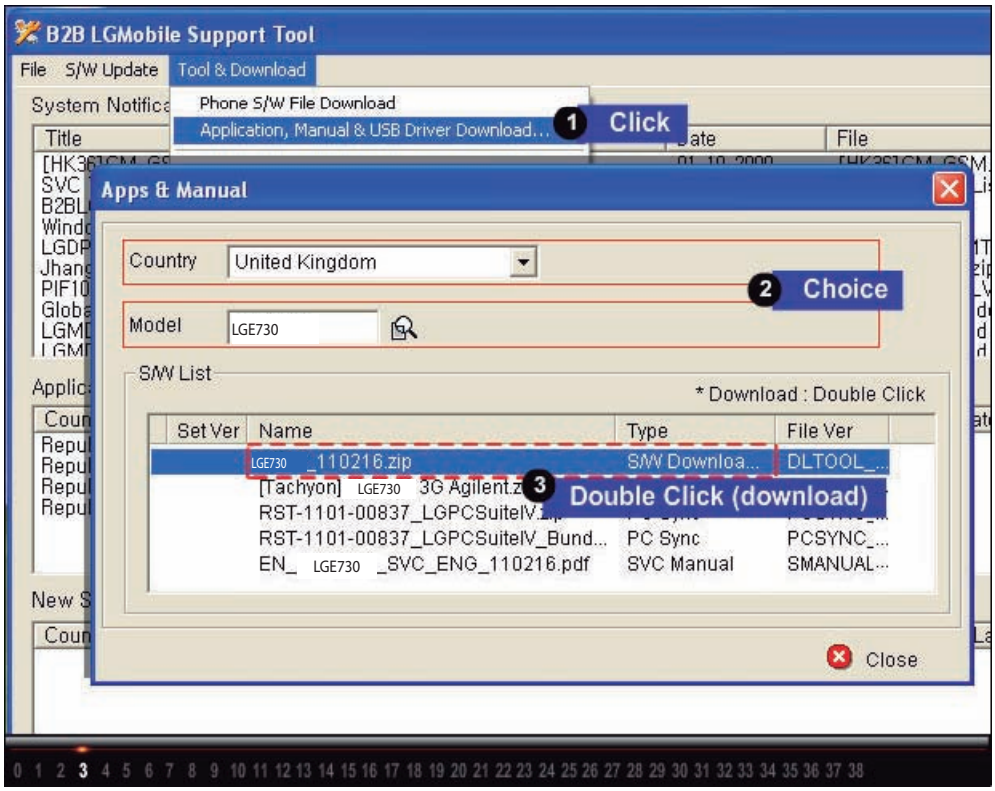


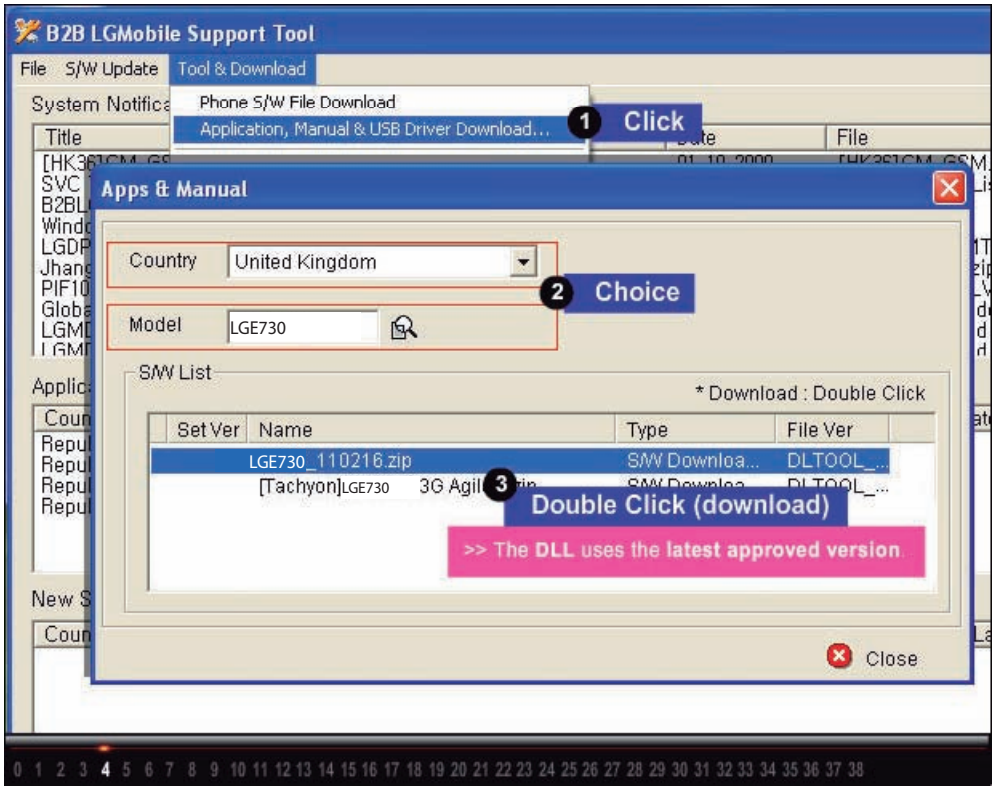


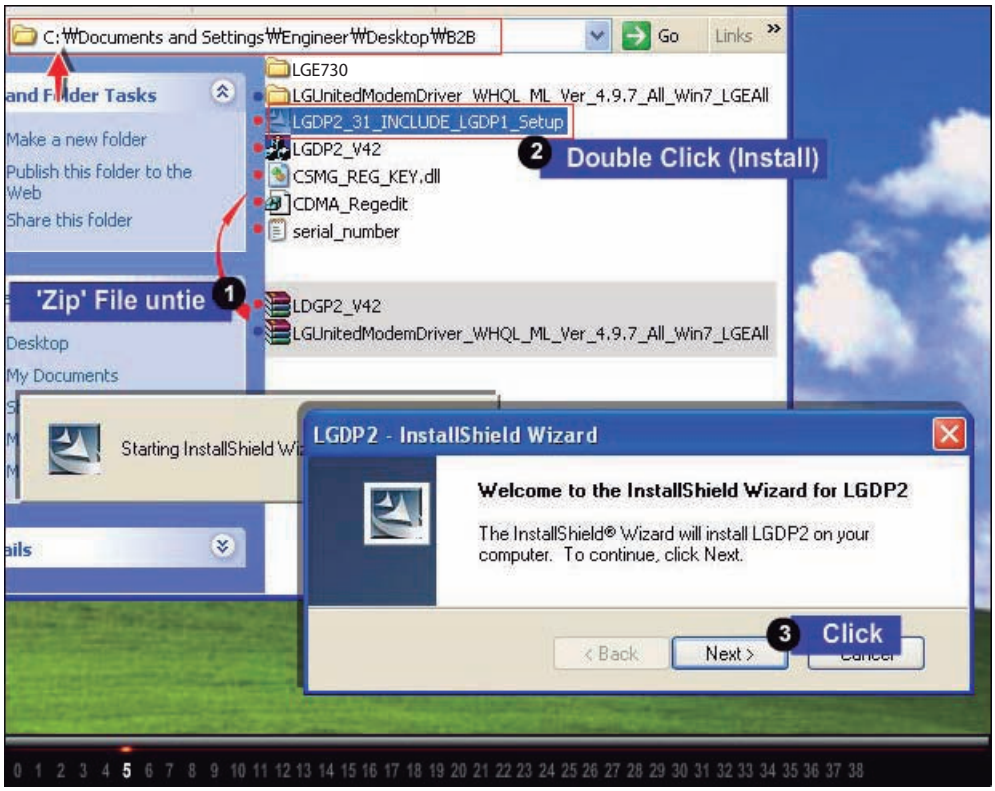
5. DOWNLOAD

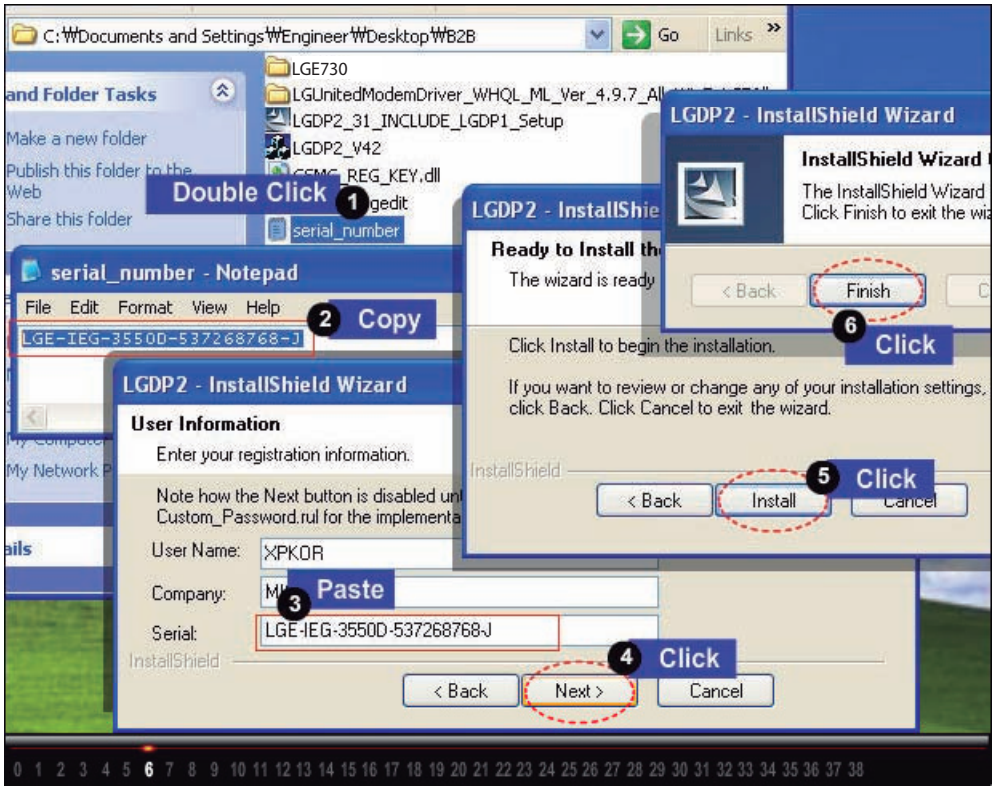


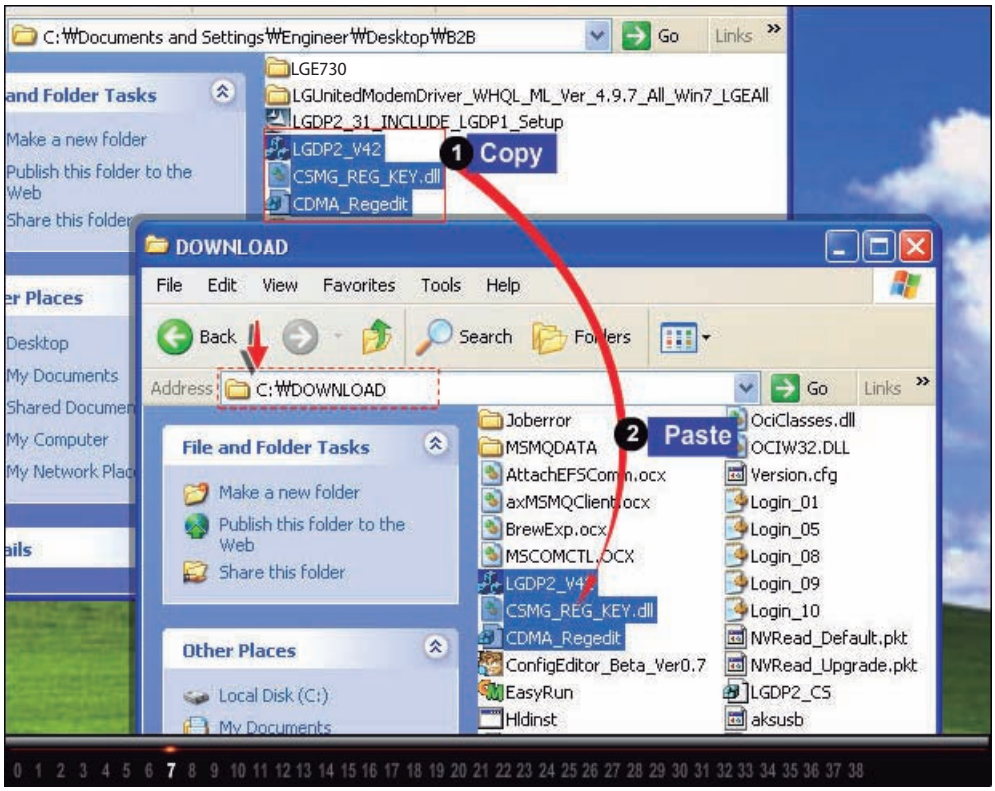


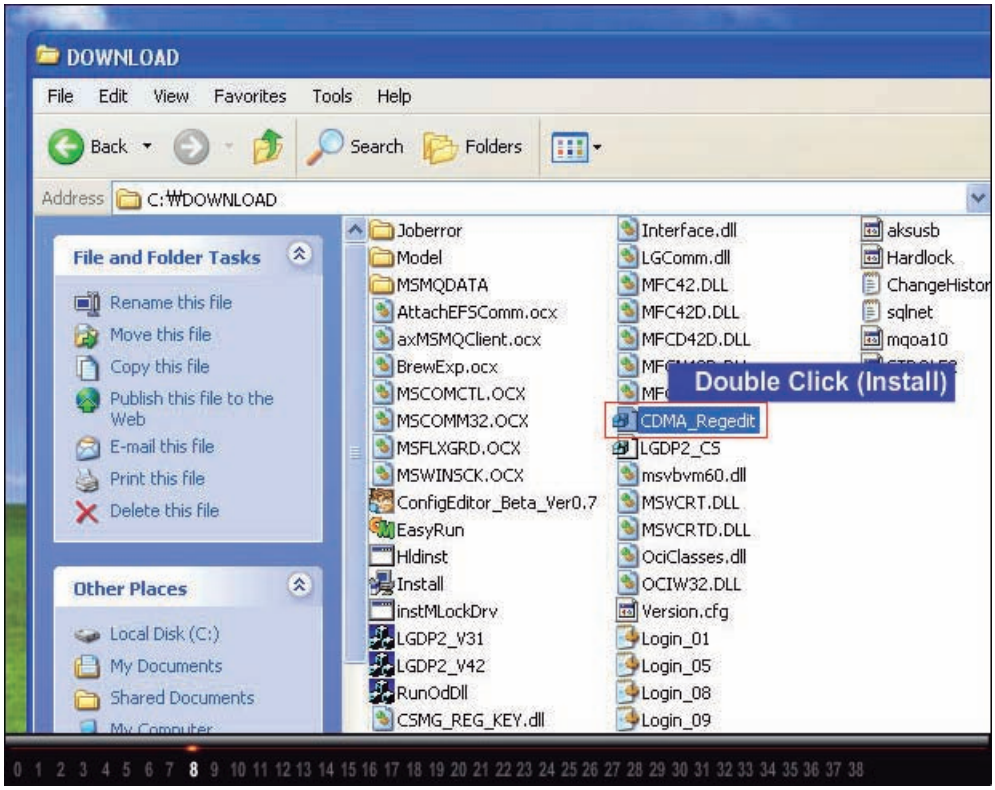


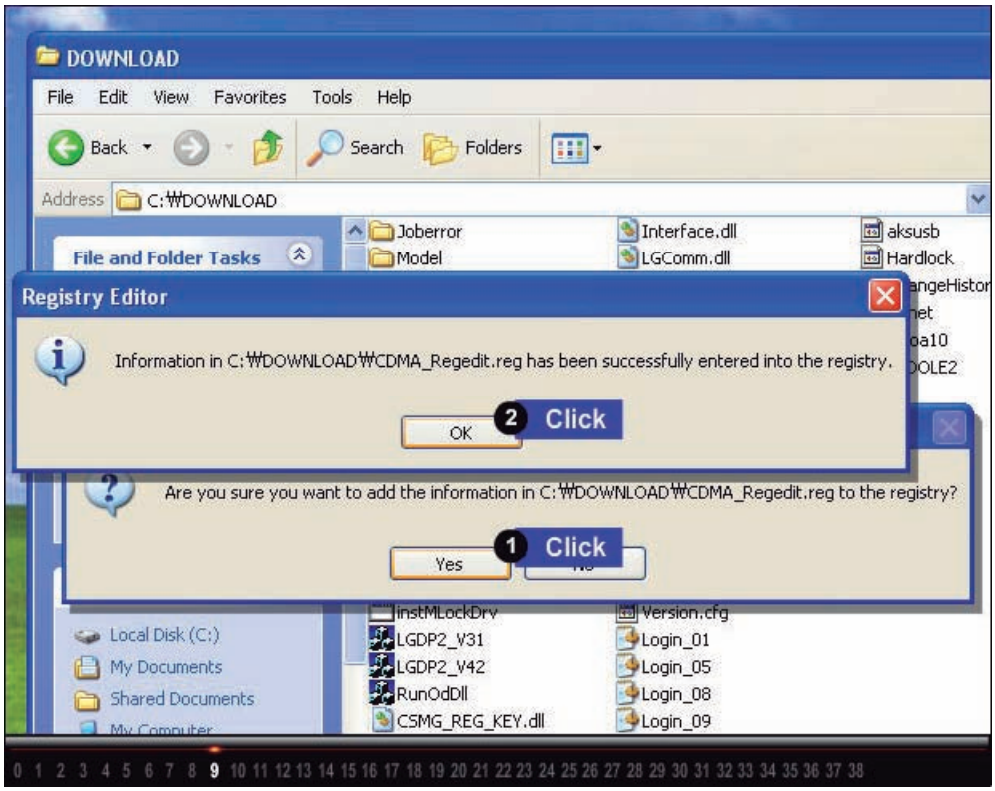


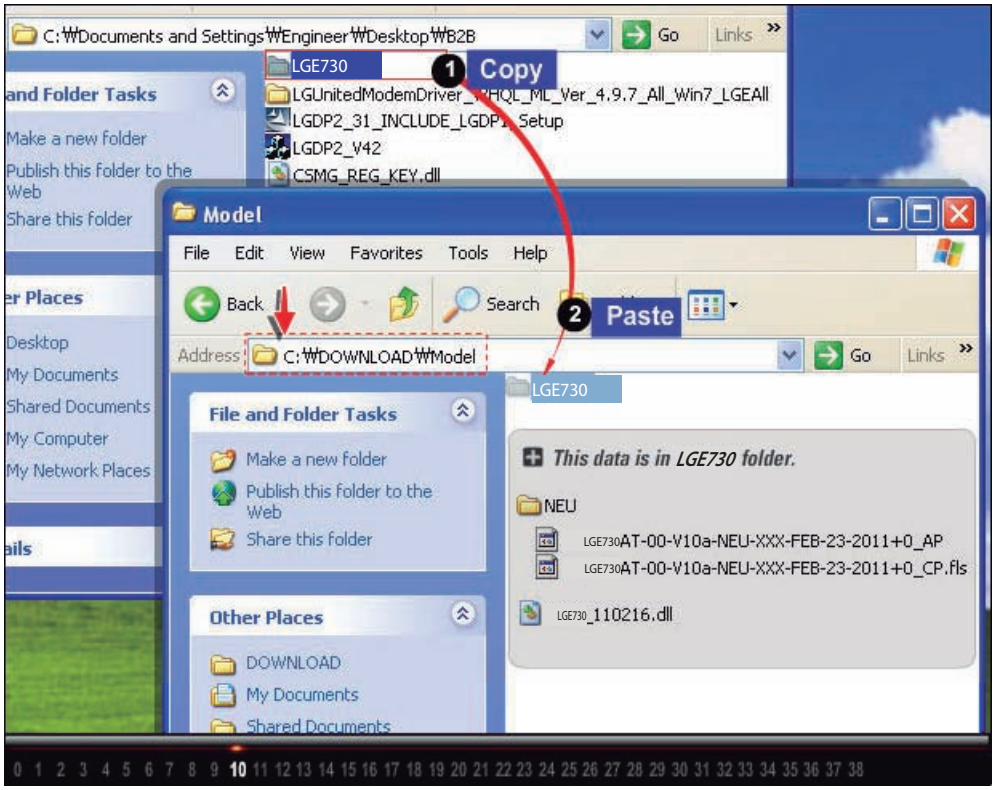


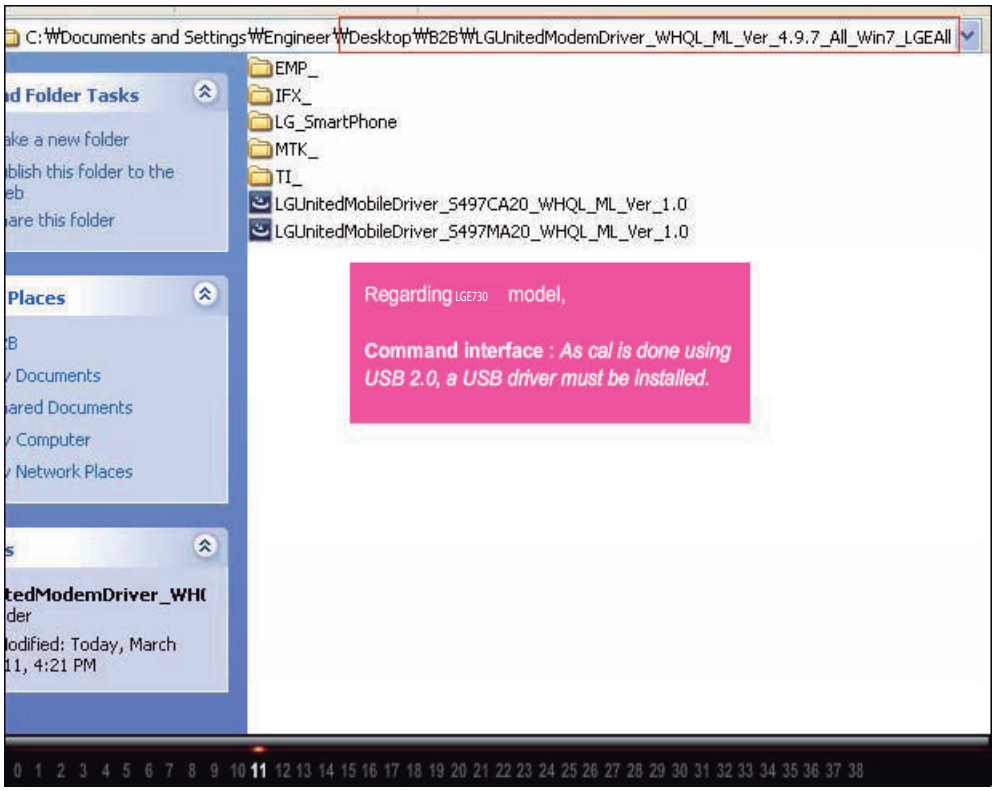


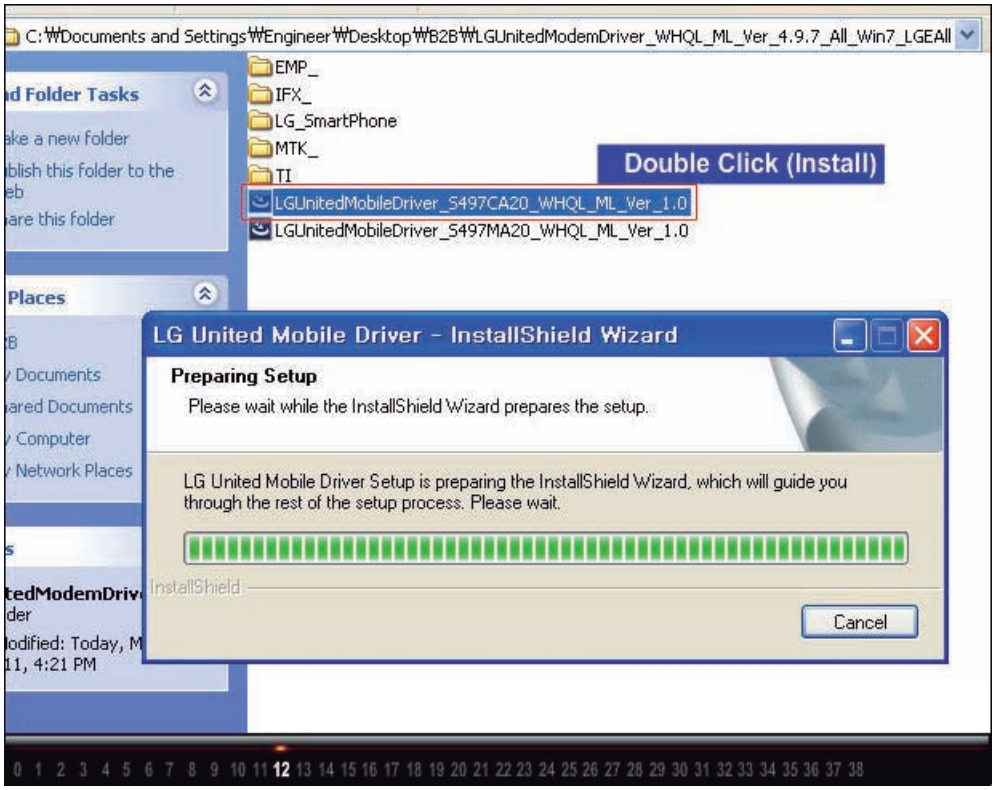


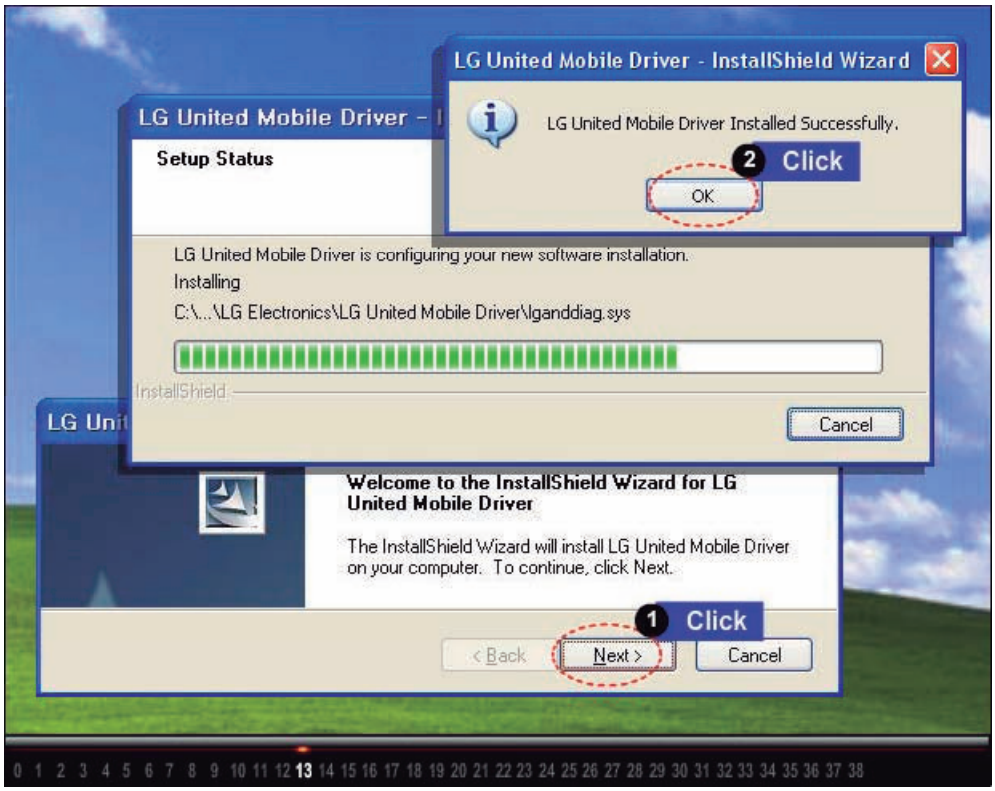


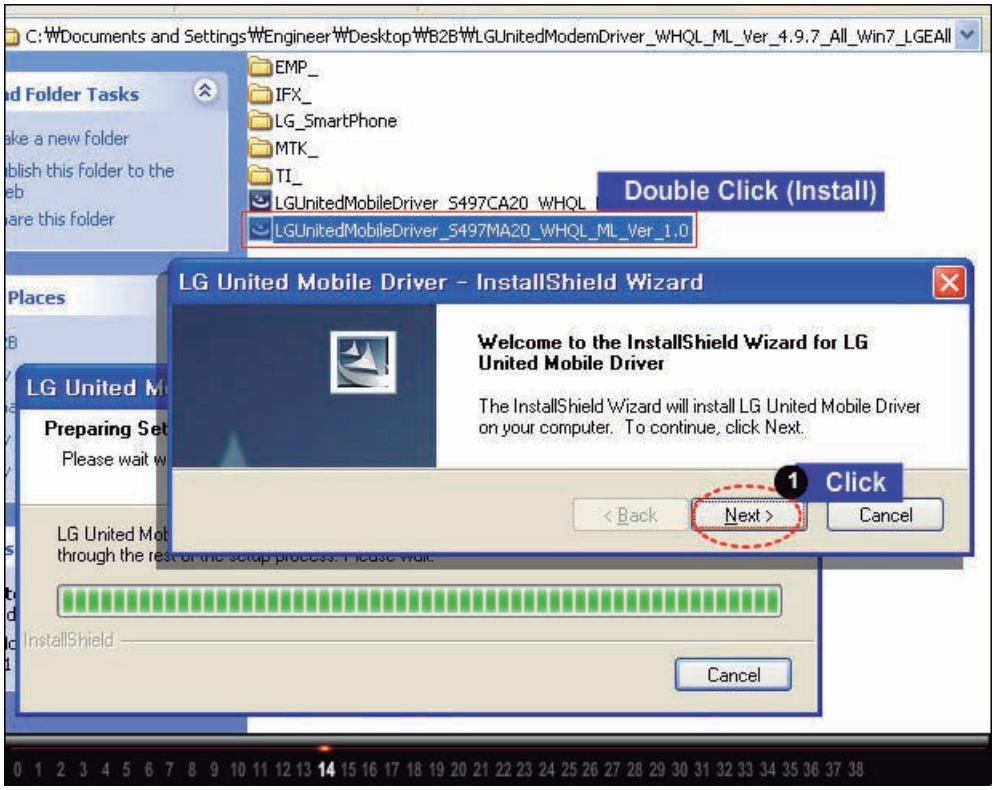


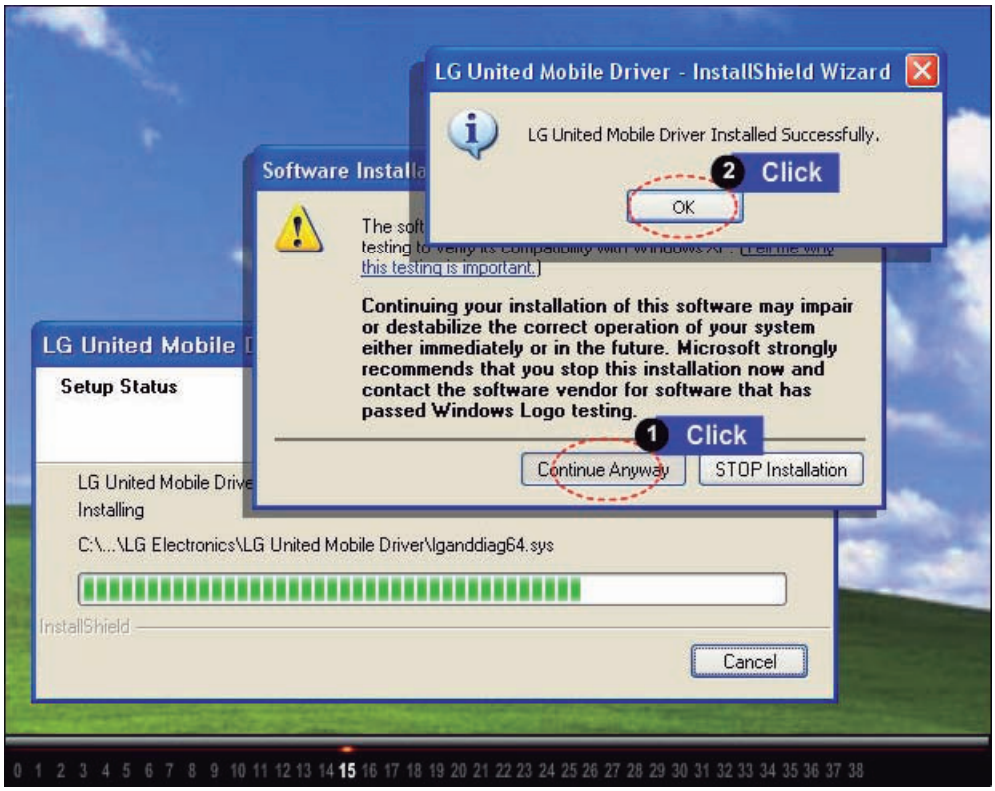


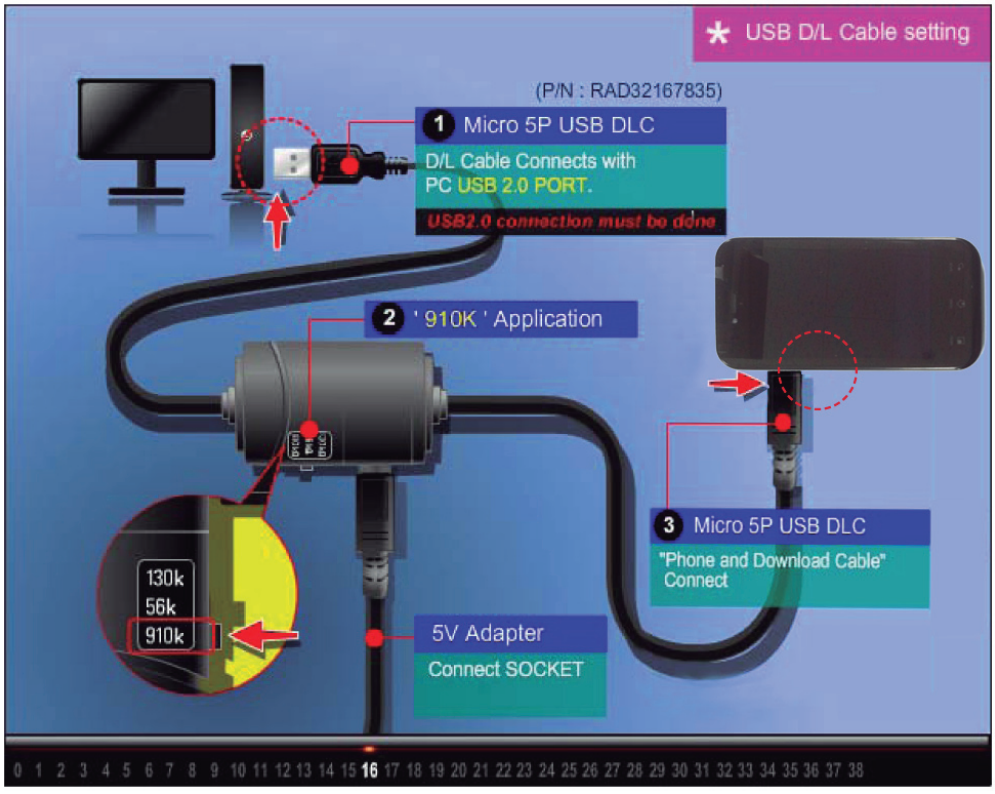


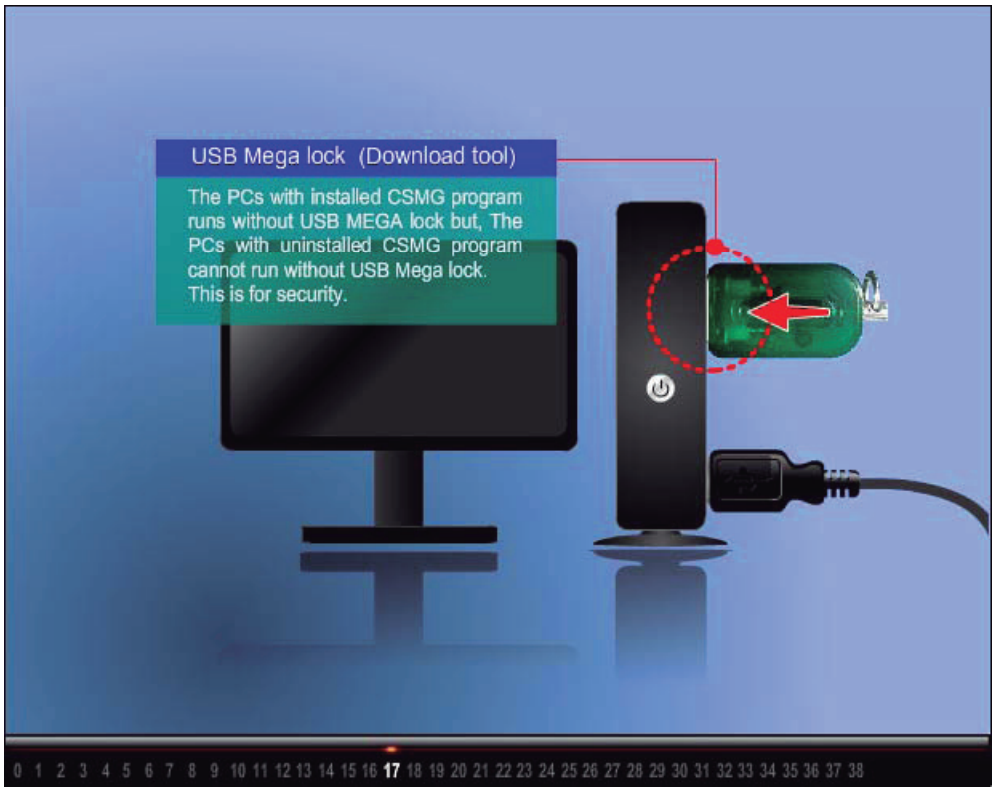


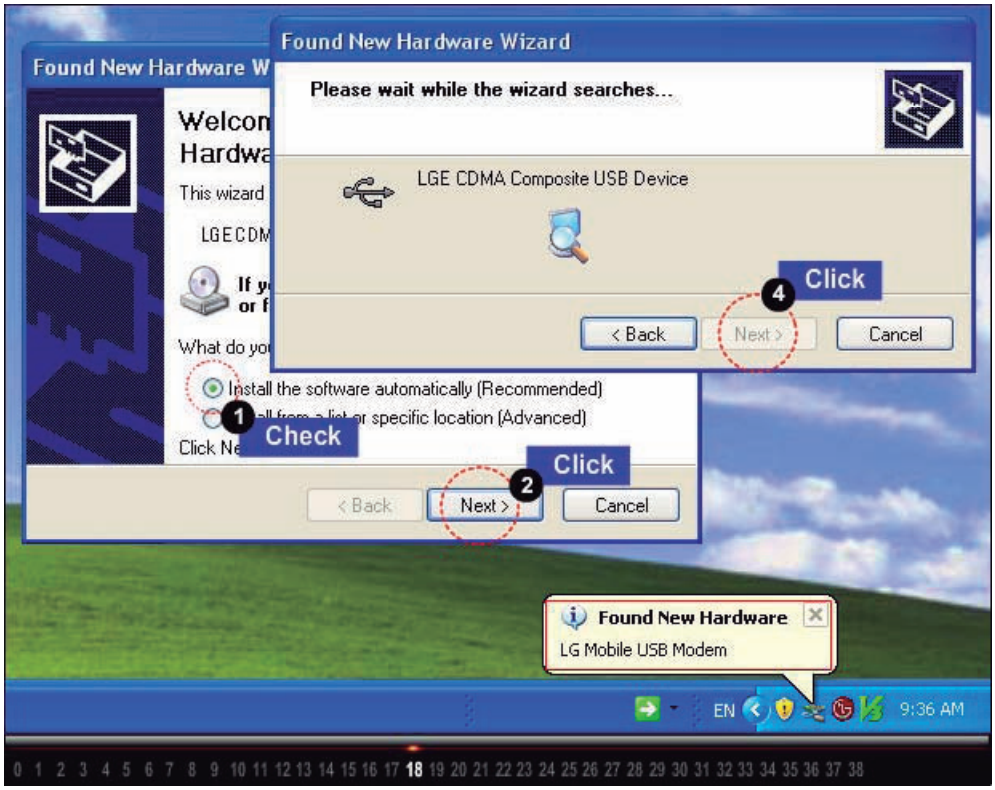


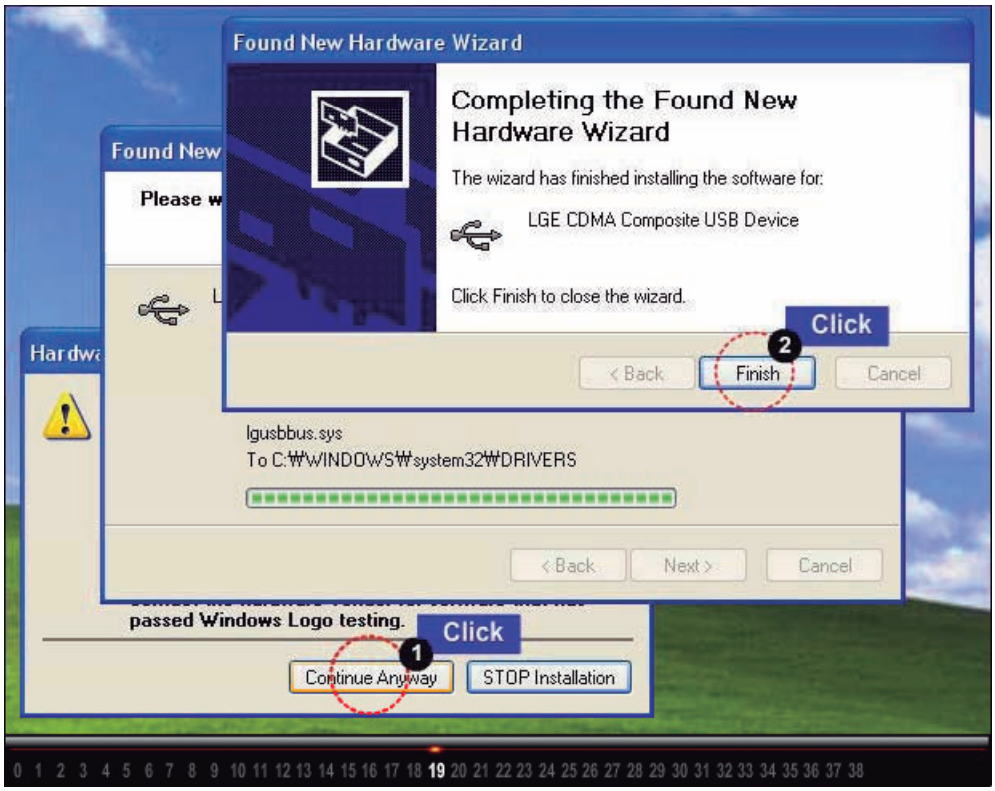


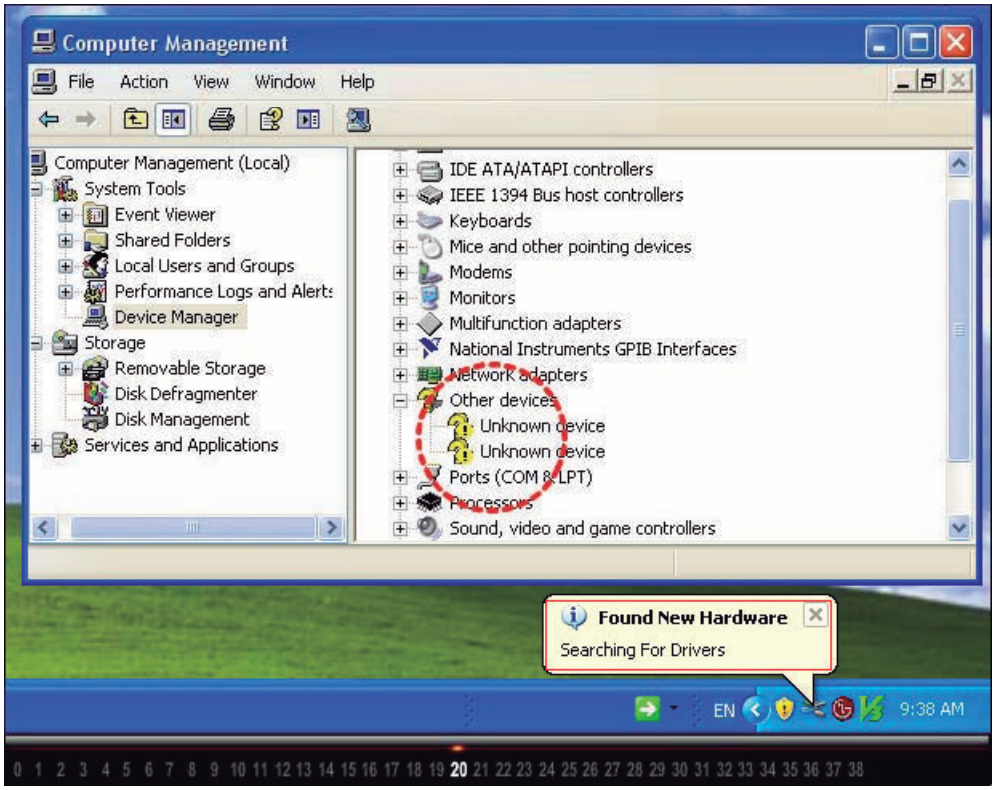


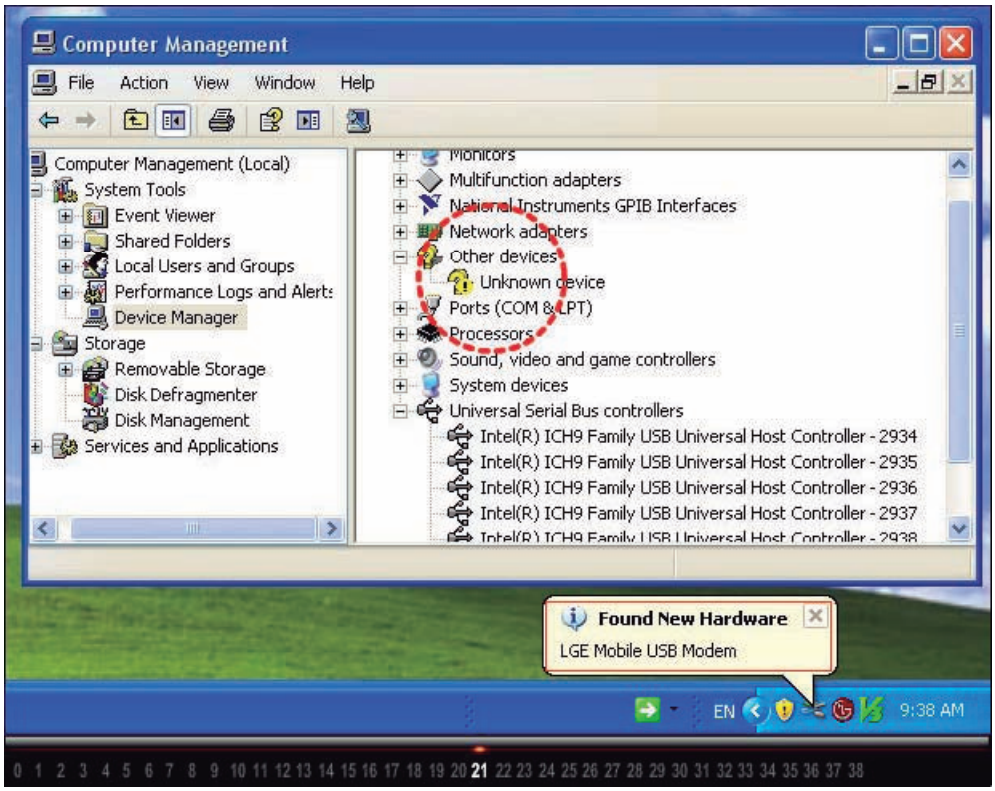


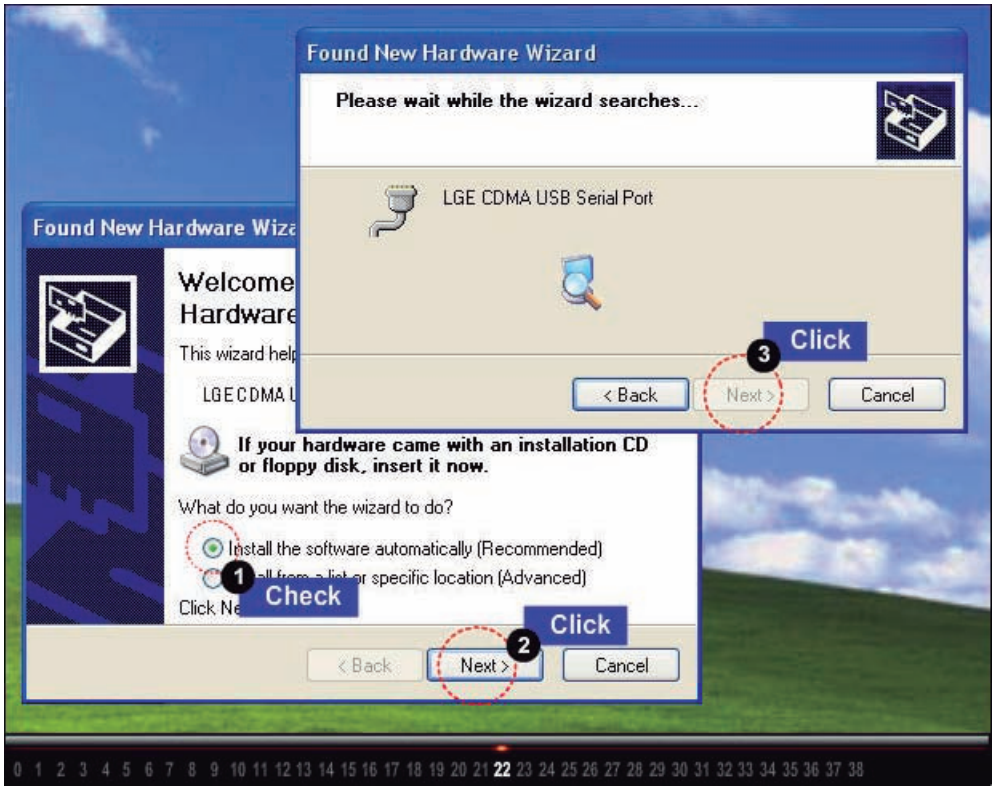


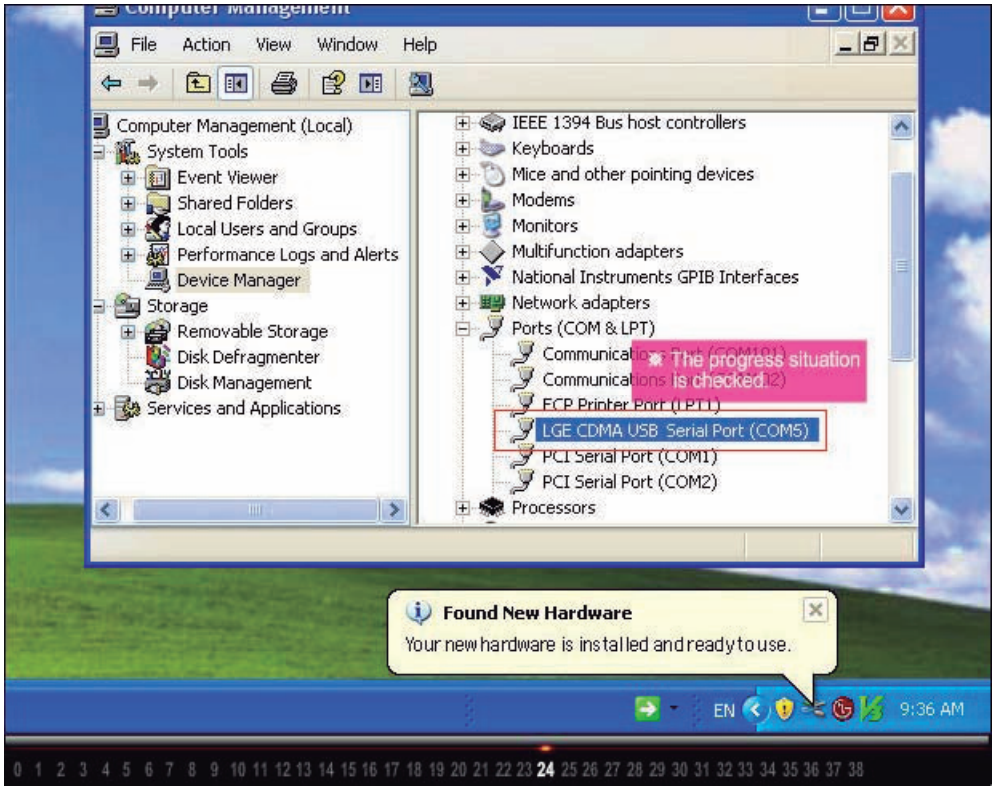


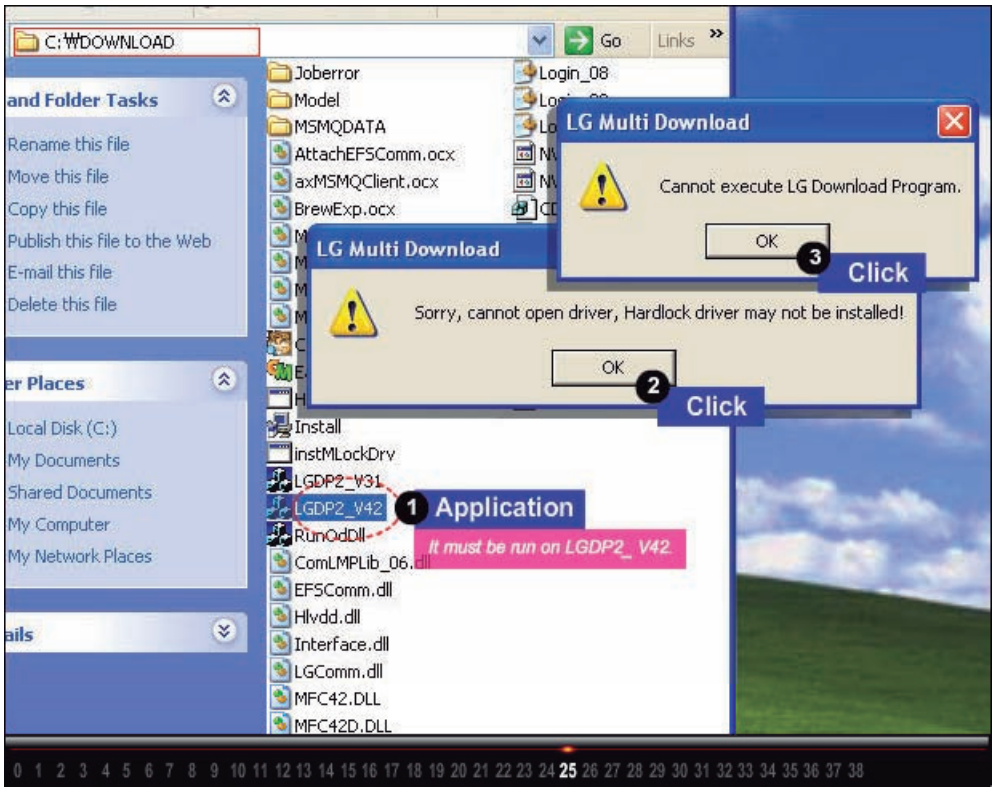


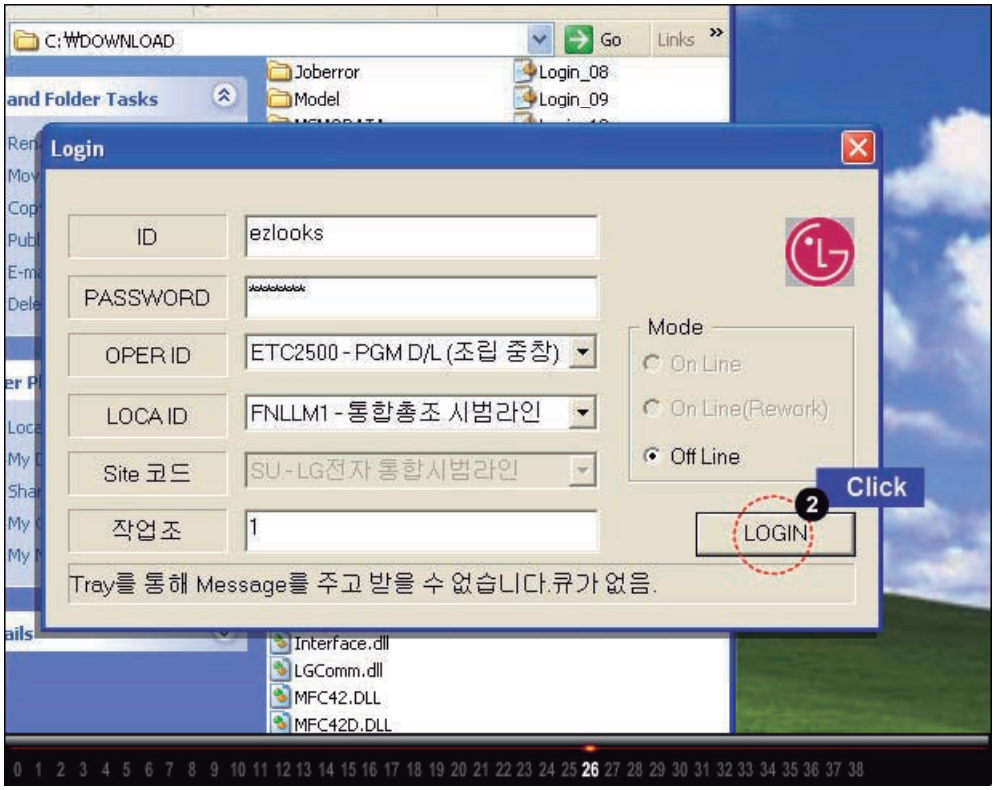


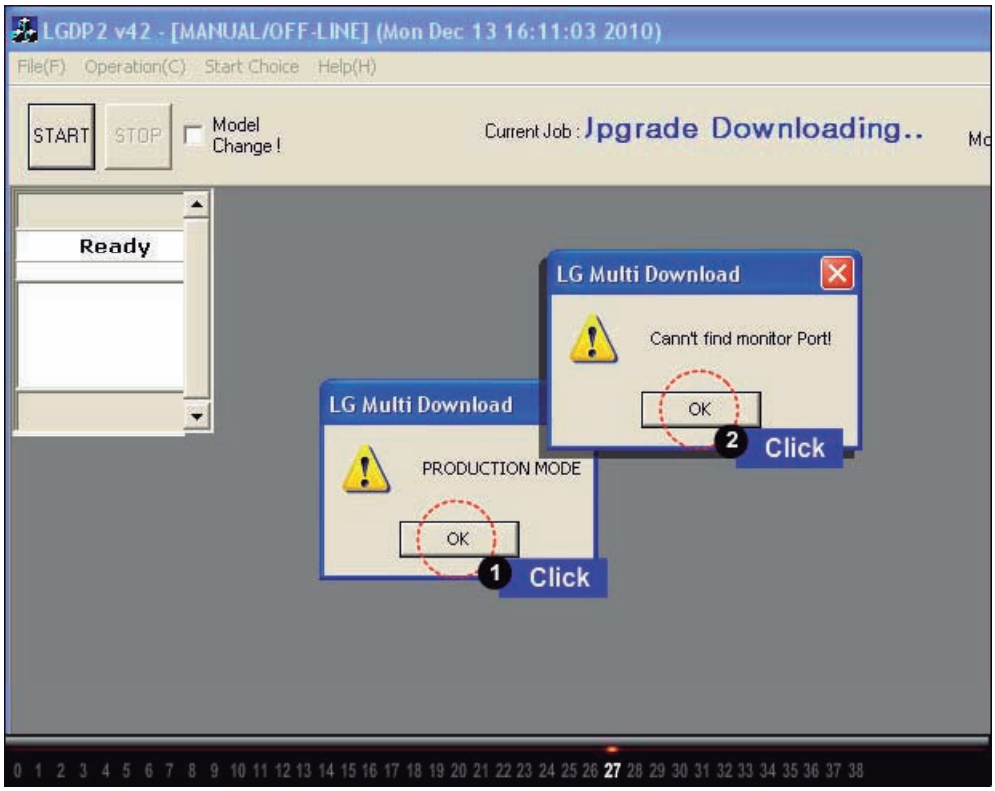


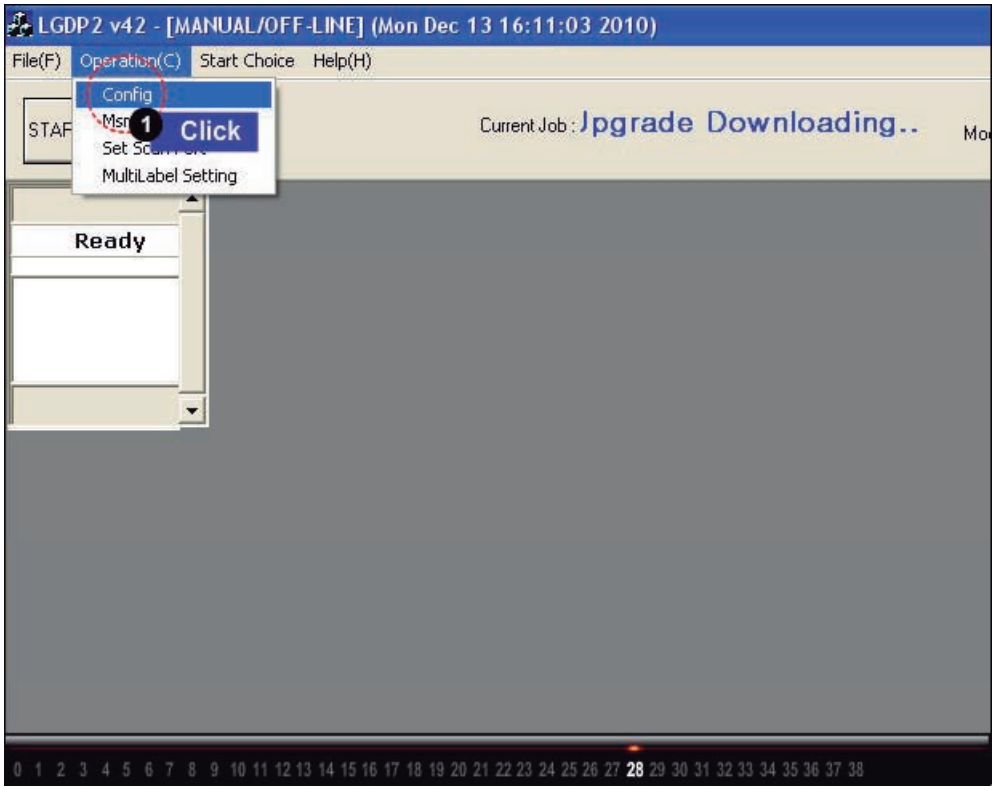


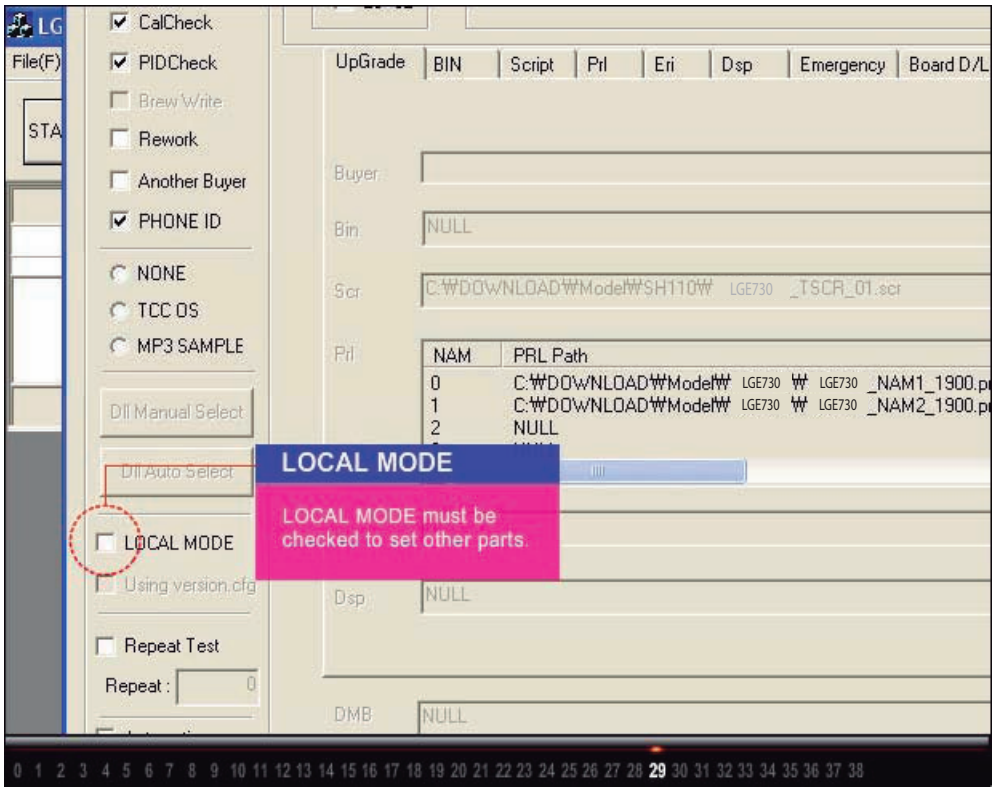


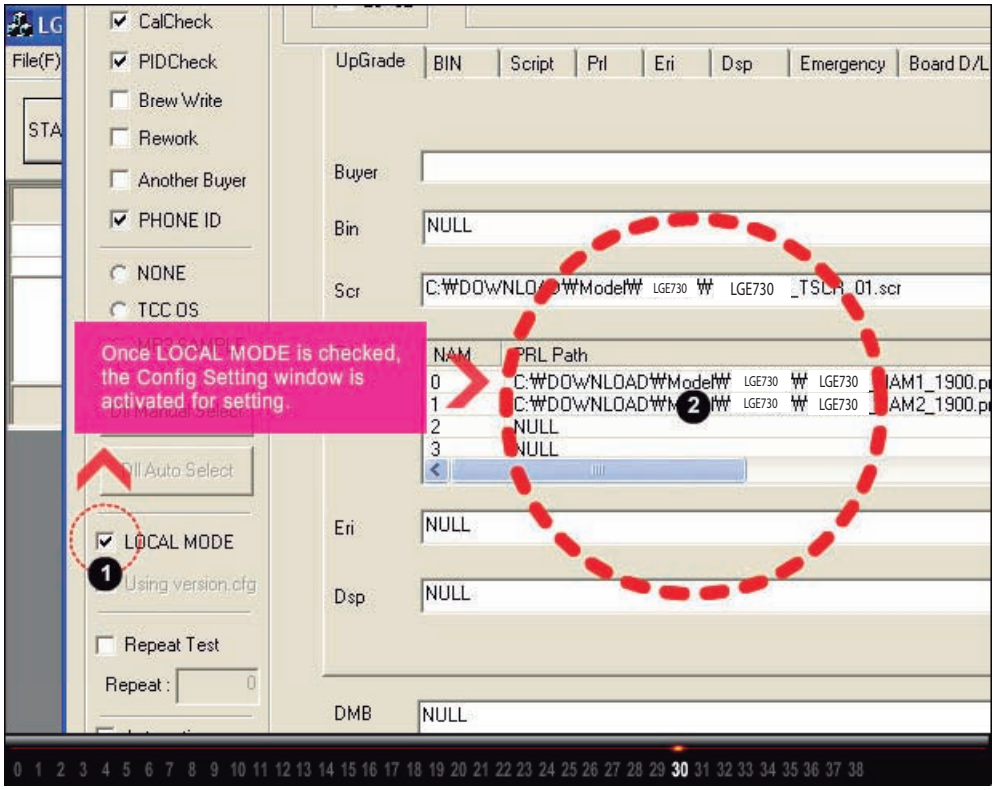


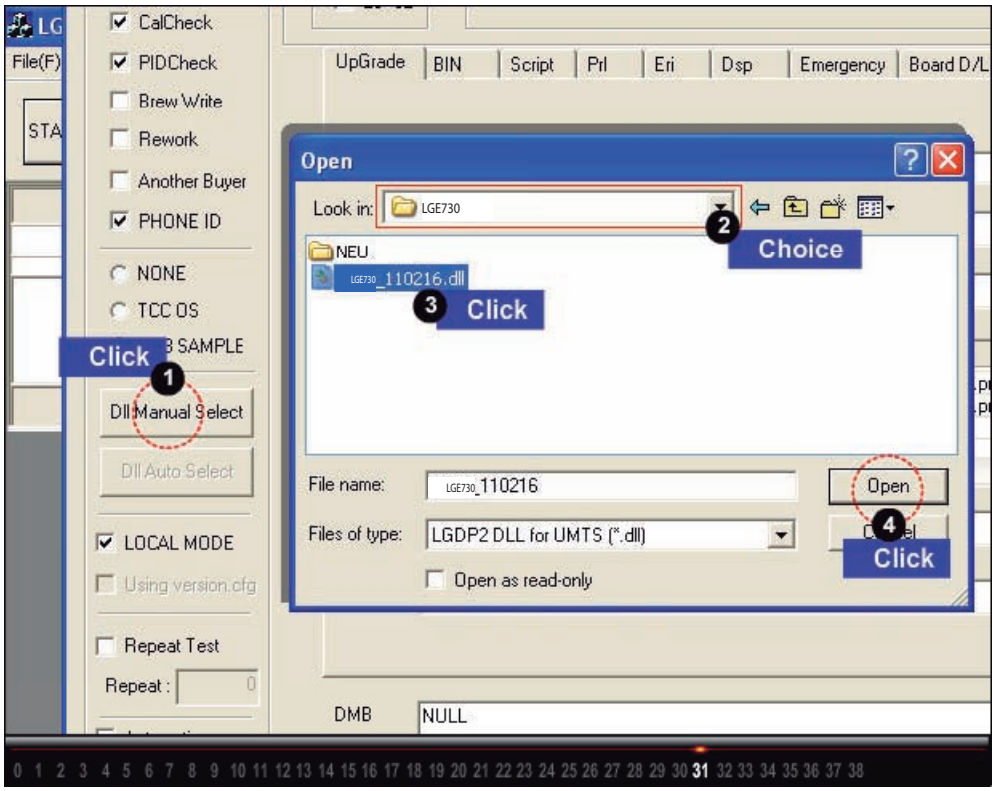


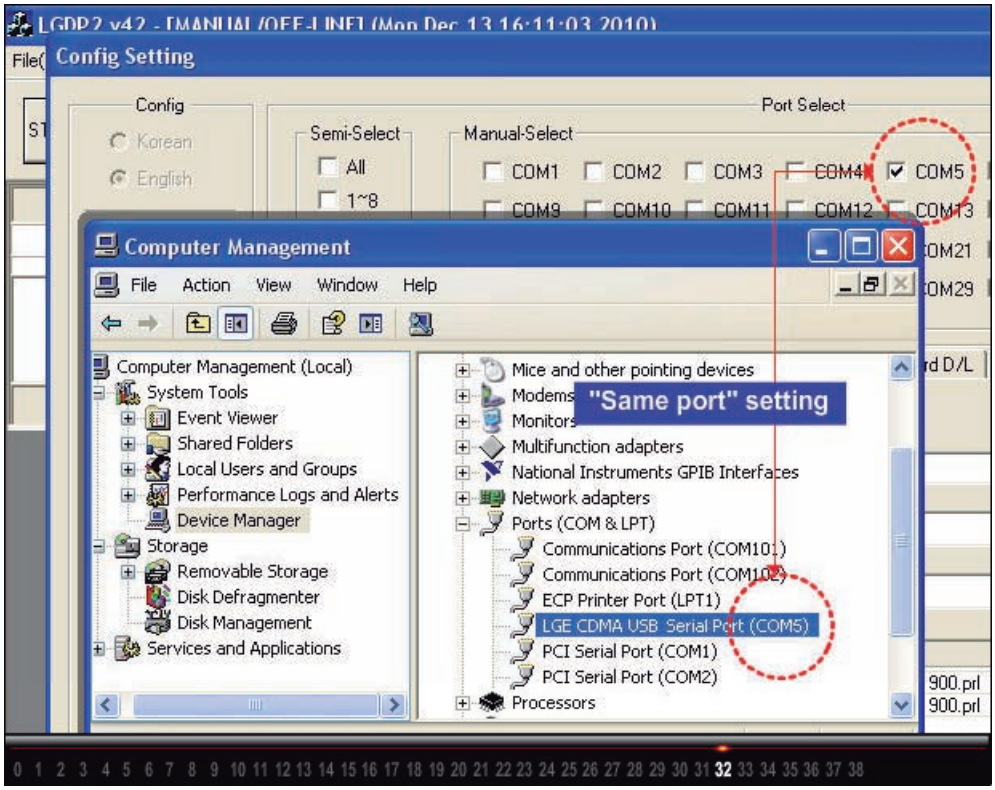


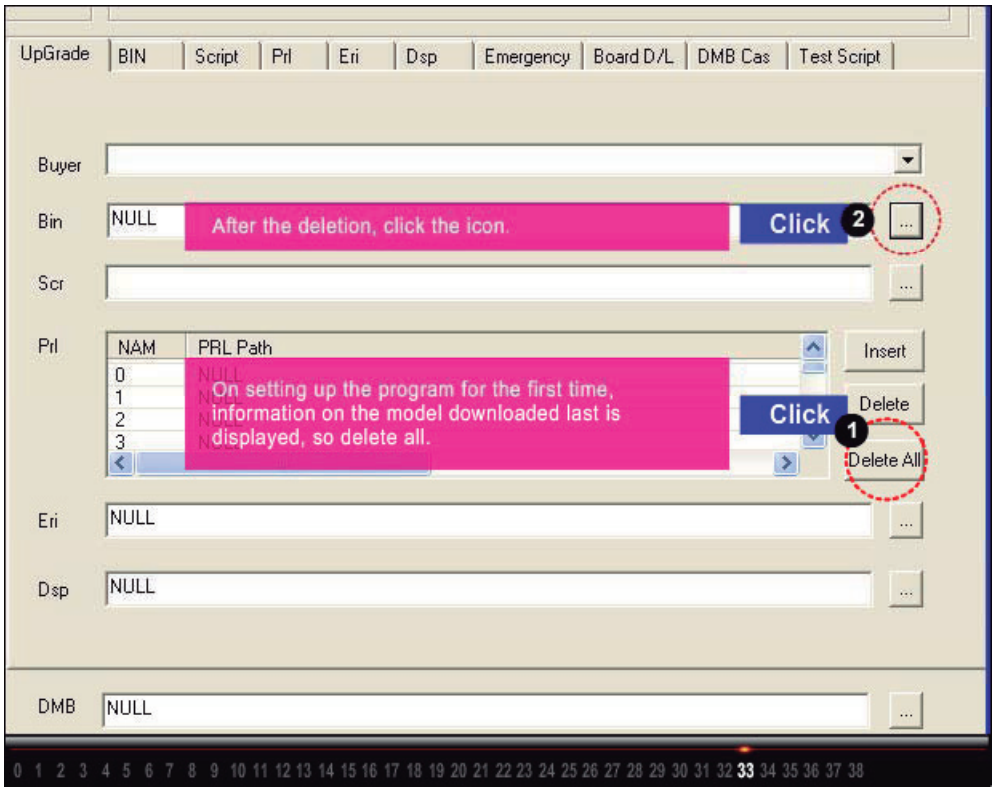


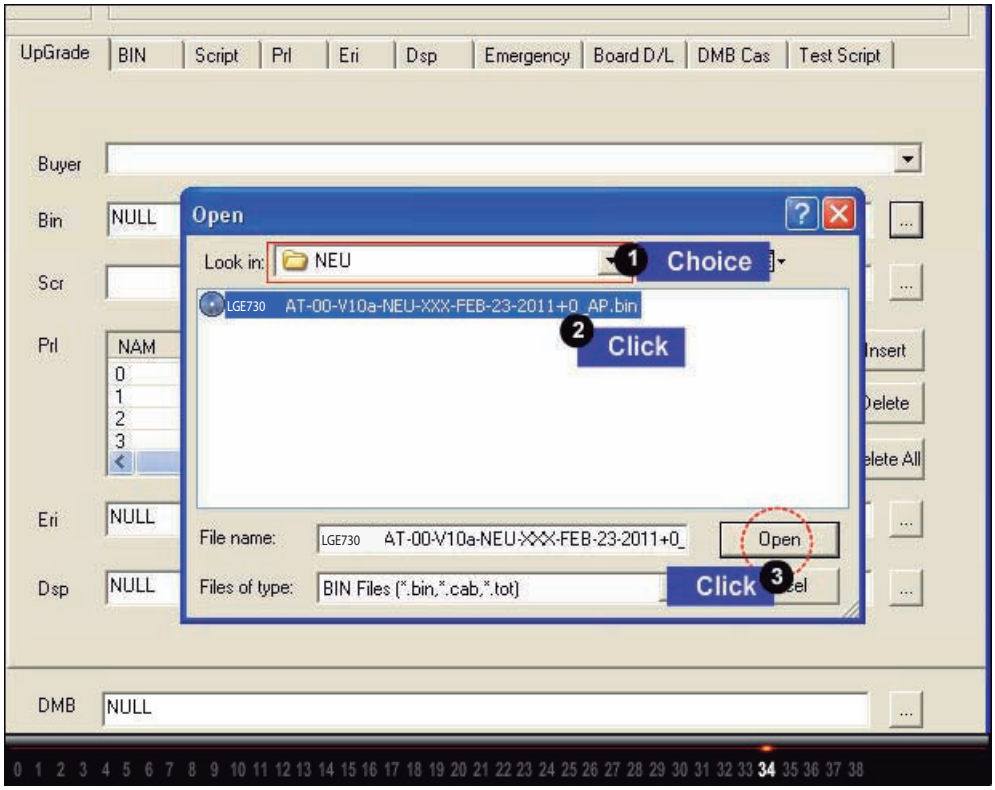


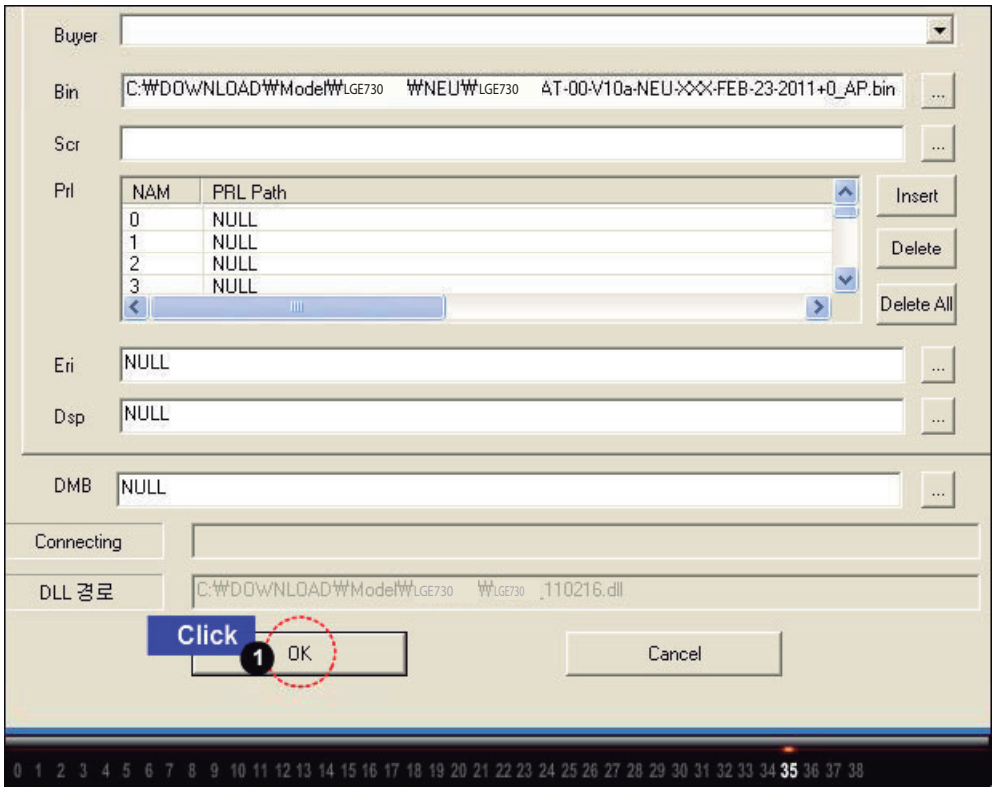


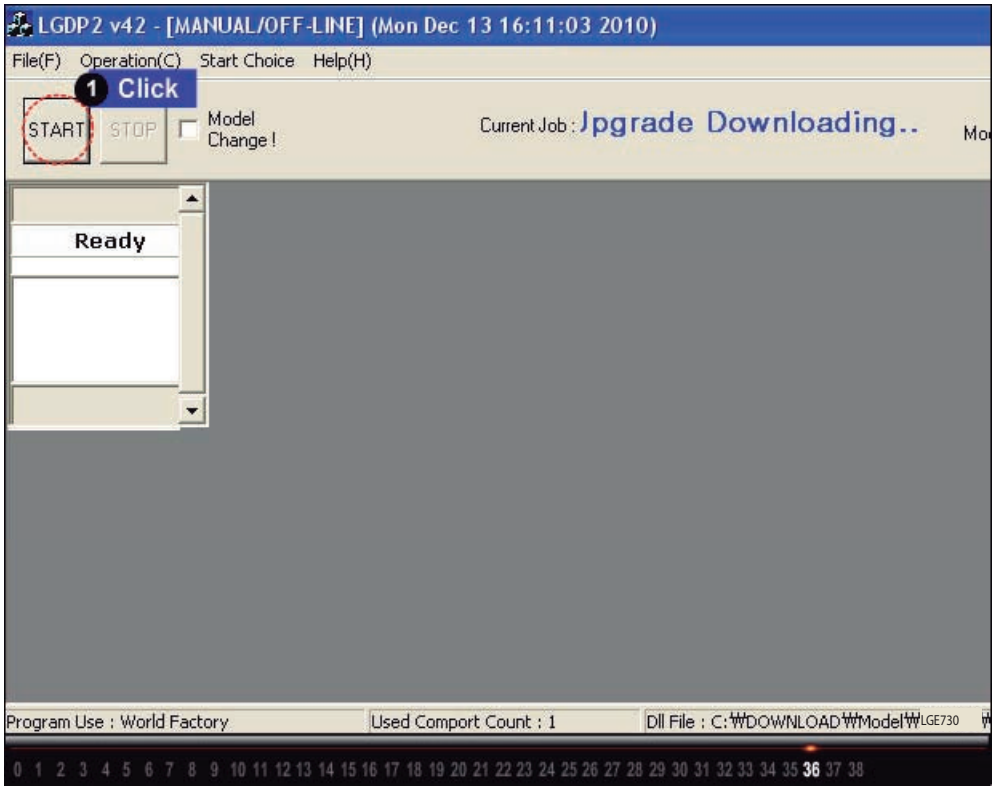


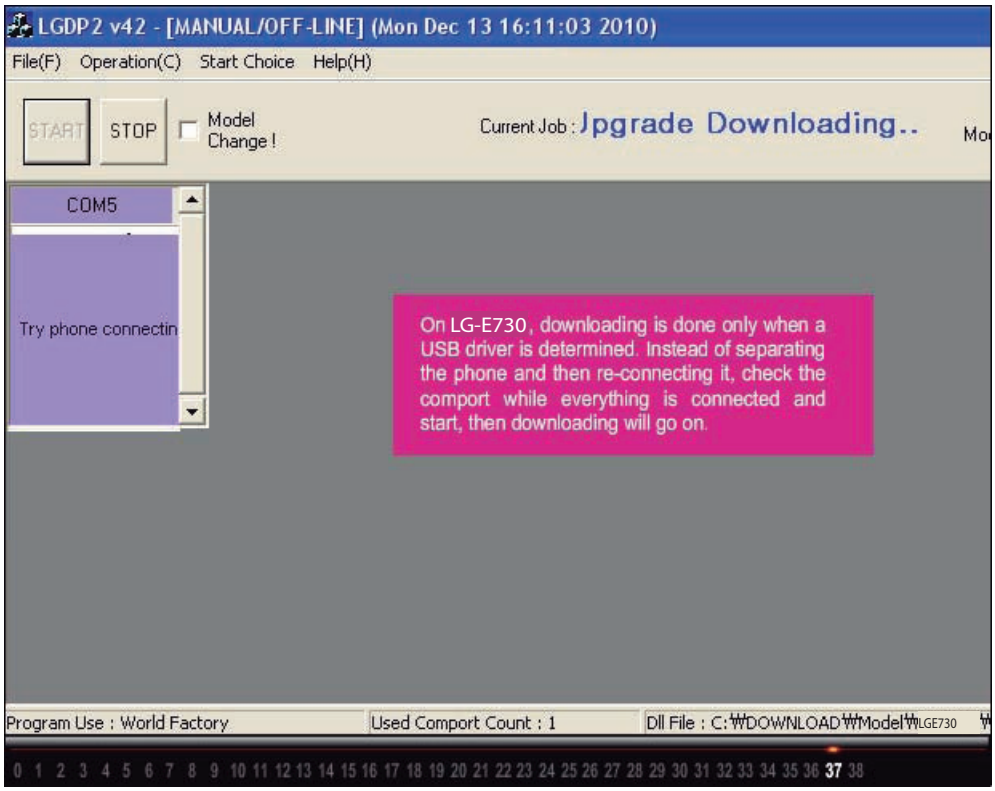


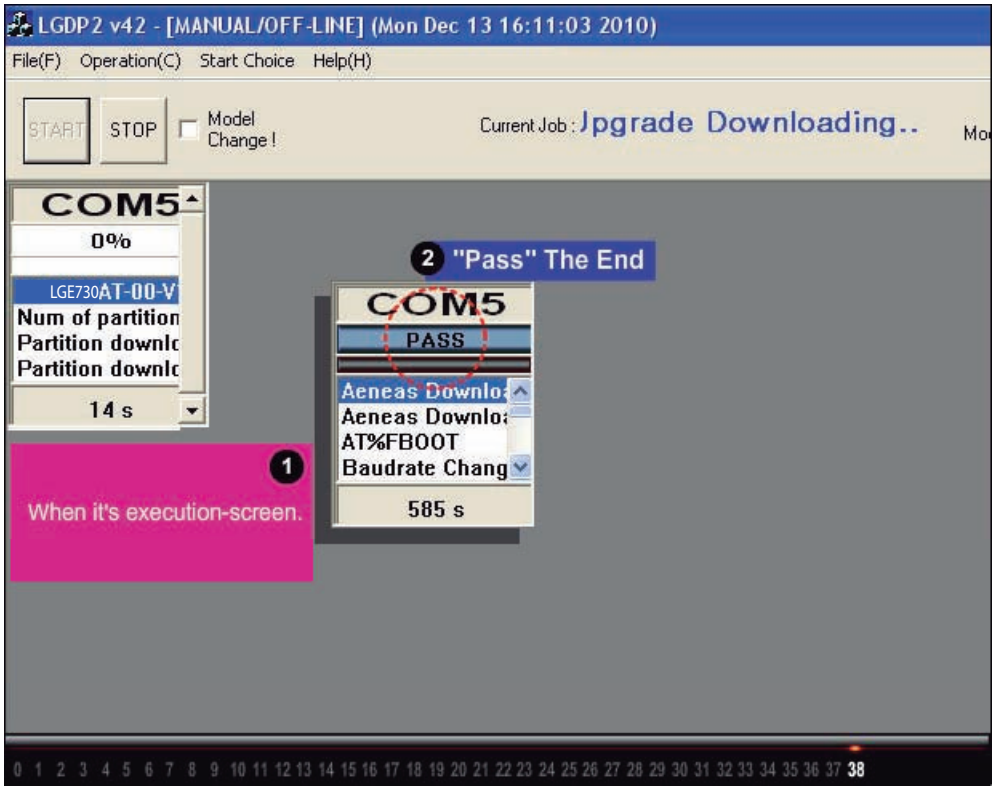






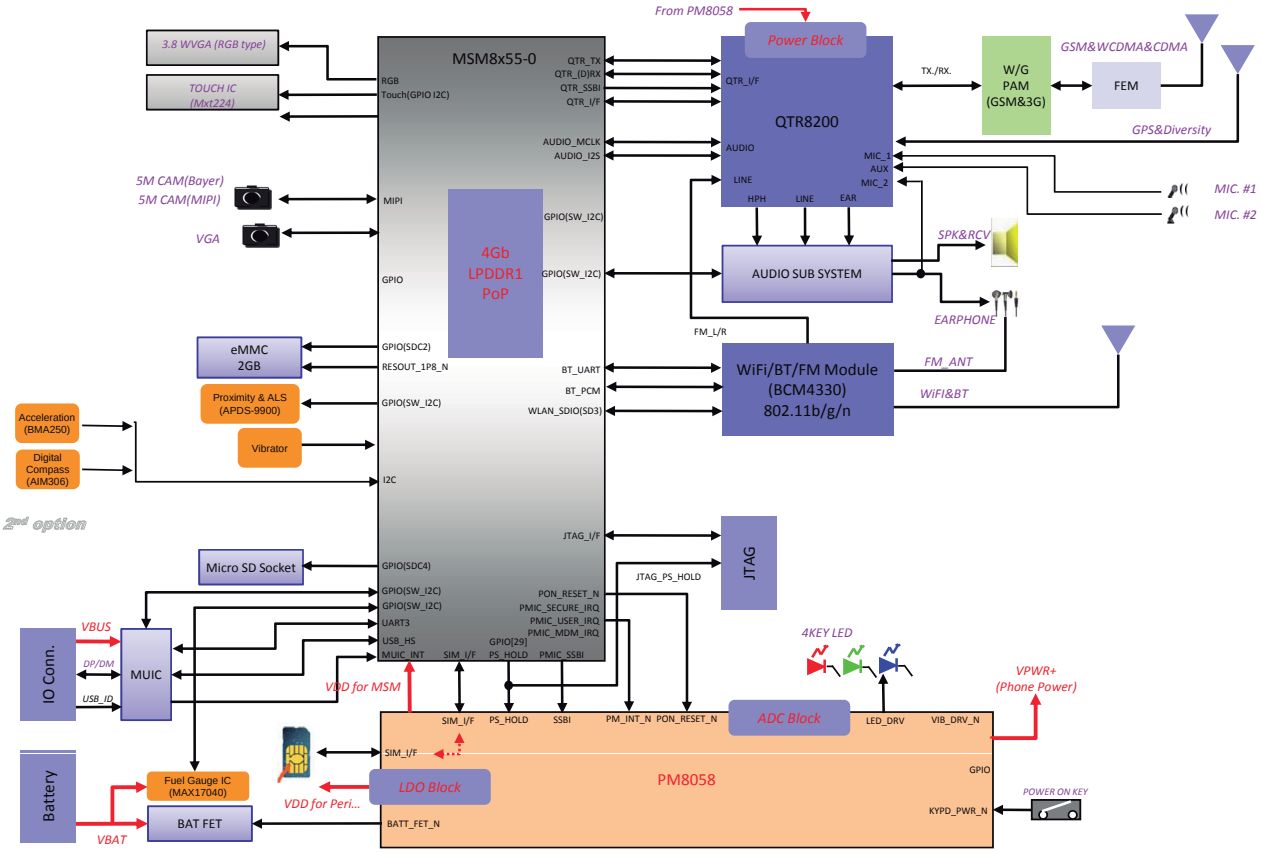




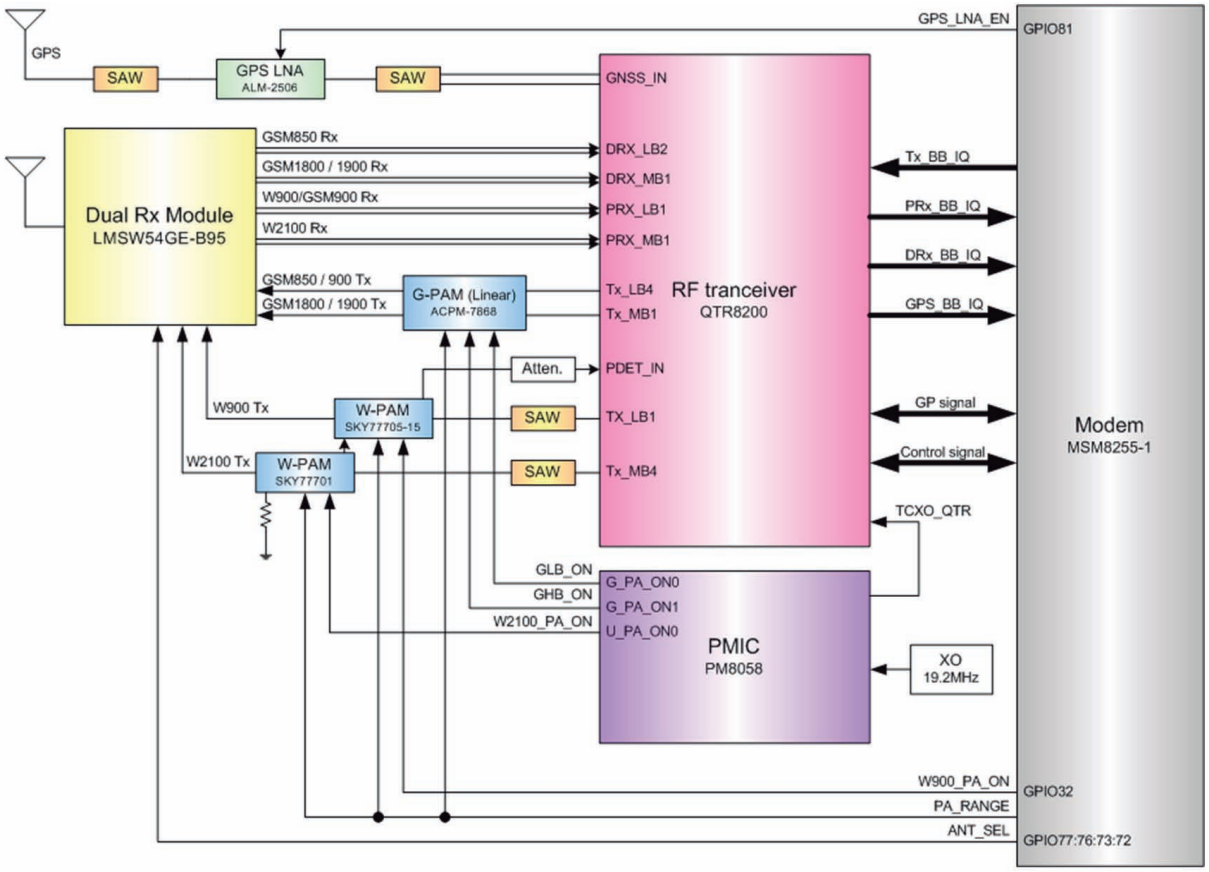


6.BLOCK DIAGRAM

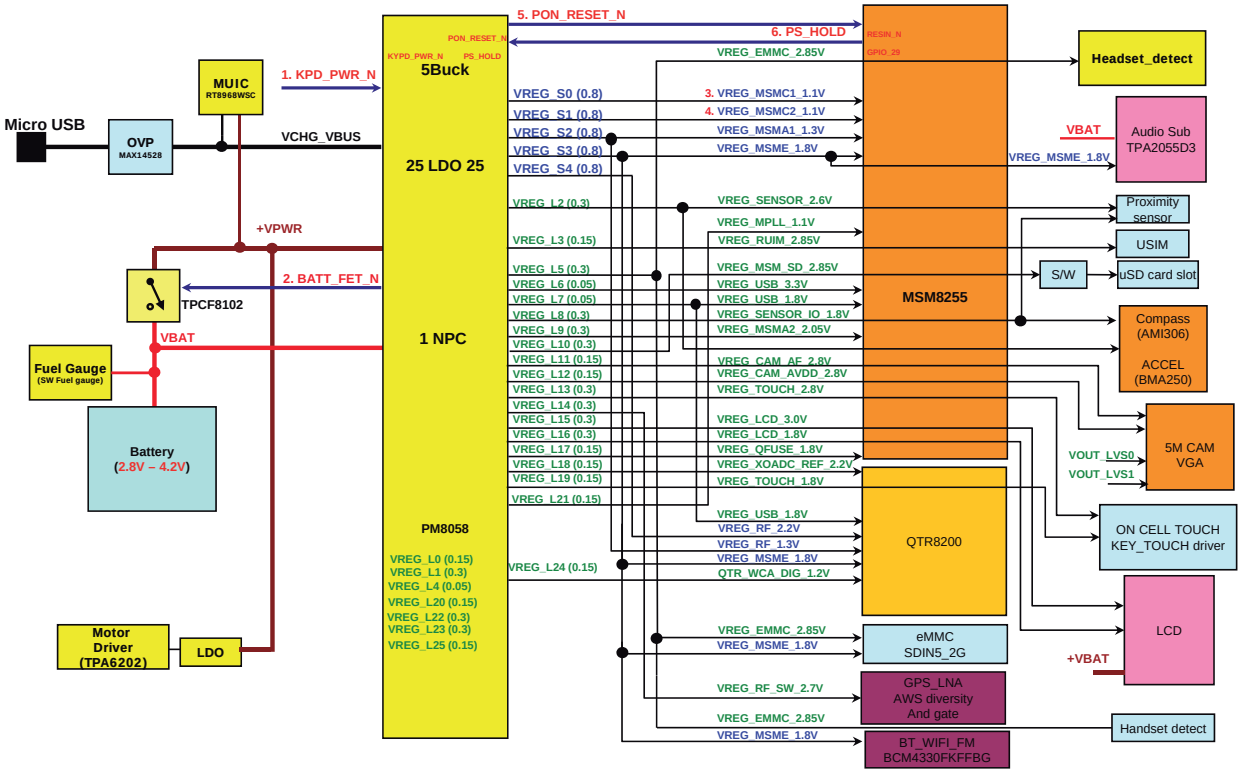
System HW Block Diagram



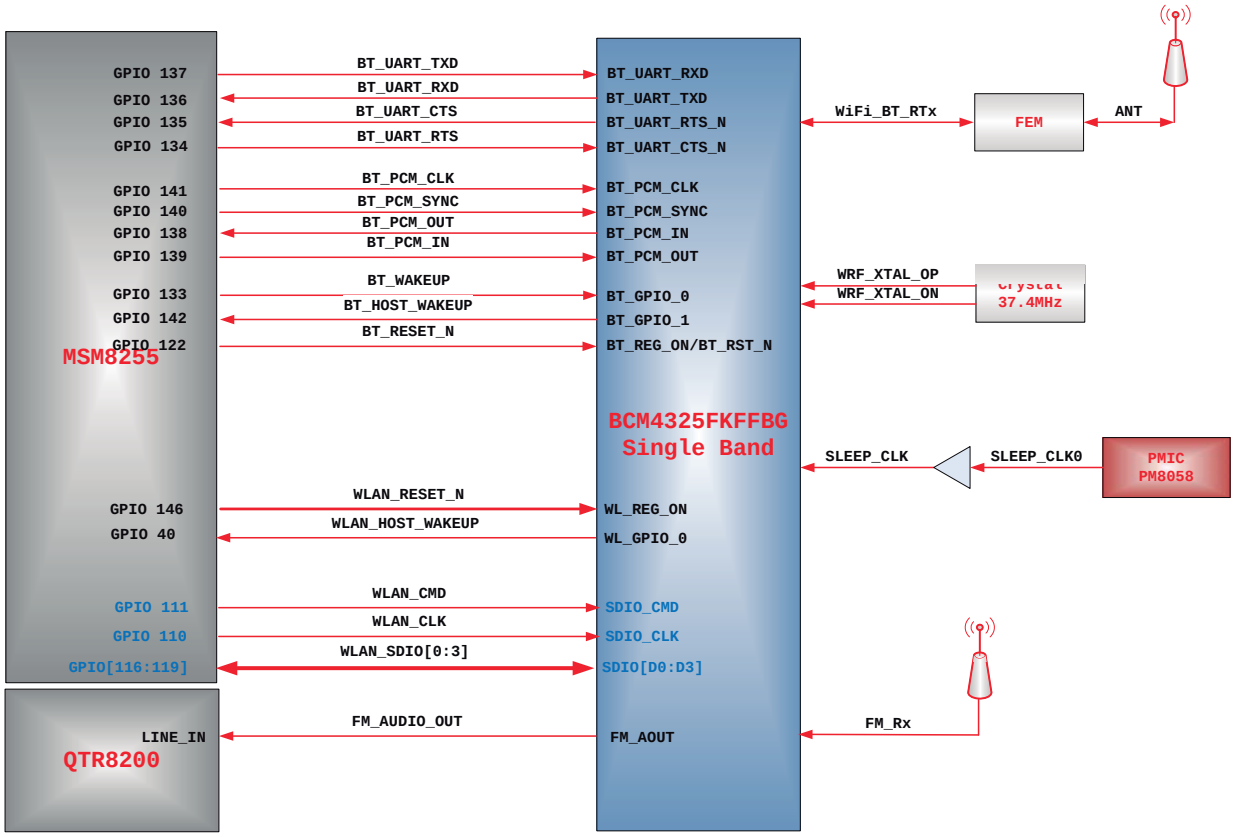
RF Block Diagram



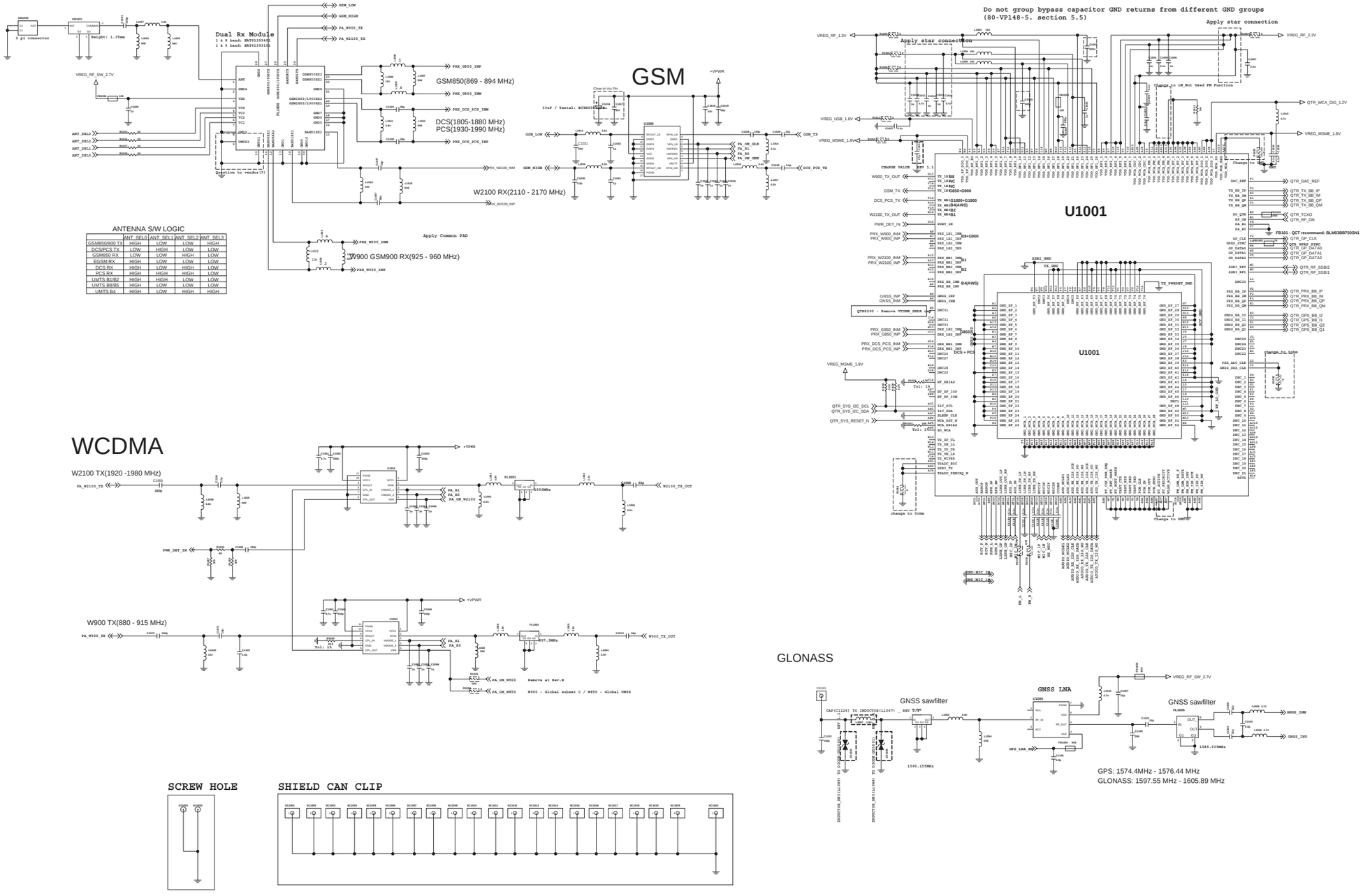
PWR Block Diagram



Connectivity Block Diagram



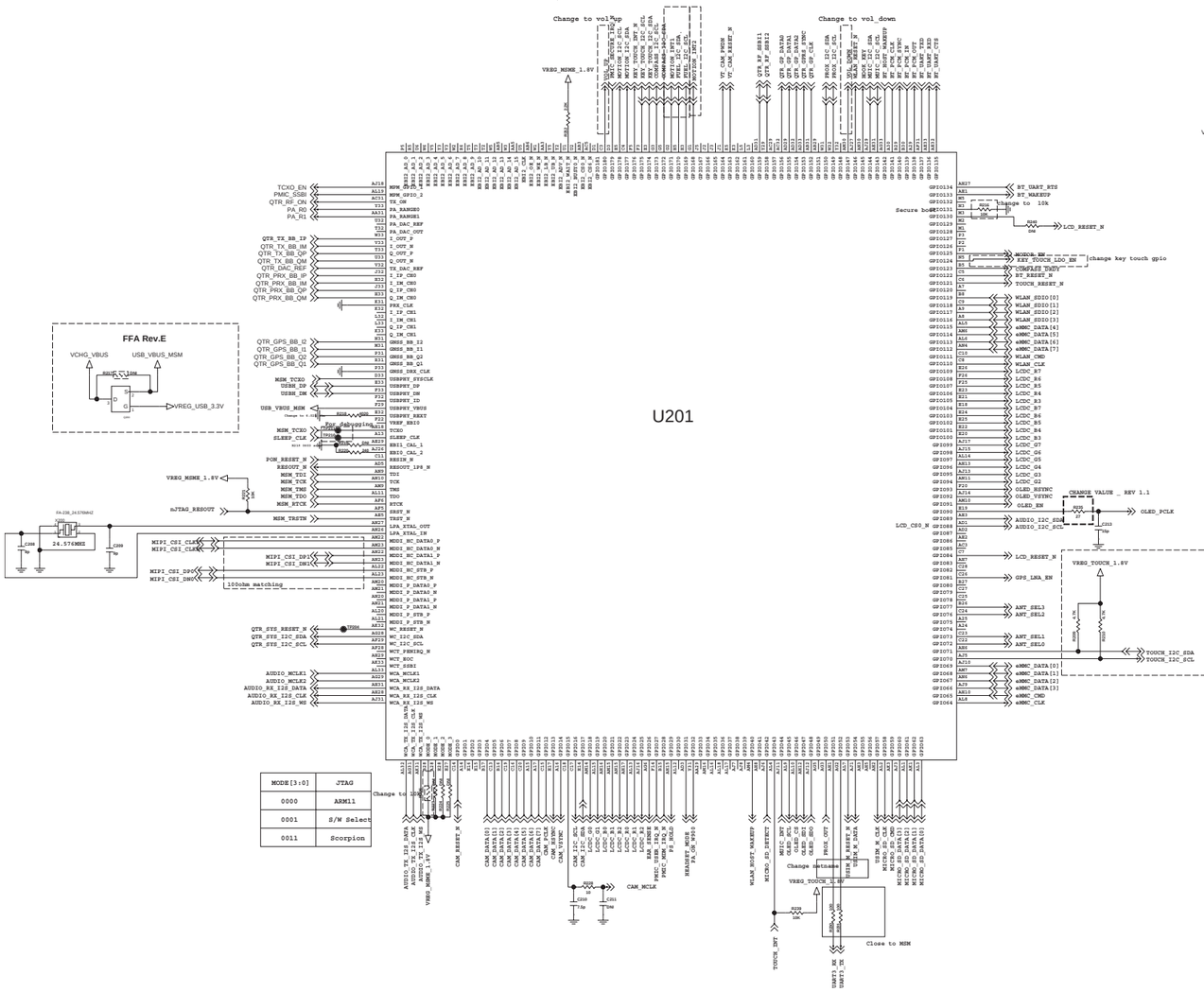
7. CIRCUIT DIAGRAM



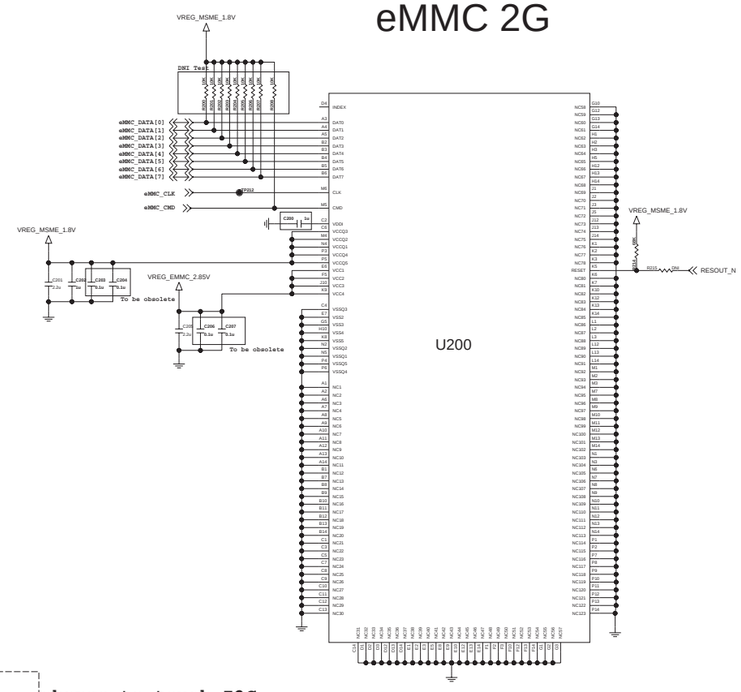
ANTENNA S/W LOGIC

	ANT_SEL0	ANT_SEL1	ANT_SEL2	ANT_SEL3
GSM850/900 TX	HIGH	LOW	LOW	HIGH
DCS/PCS TX	LOW	HIGH	LOW	LOW
GSM850 RX	LOW	LOW	HIGH	LOW
EGSM RX	HIGH	LOW	LOW	LOW
DCS RX	HIGH	LOW	HIGH	LOW
PCS RX	HIGH	HIGH	HIGH	LOW
UMTS B1/B2	HIGH	HIGH	LOW	LOW
UMTS B8/B5	HIGH	LOW	LOW	LOW
UMTS B4	HIGH	LOW	HIGH	HIGH

MSM8255-1_DATA



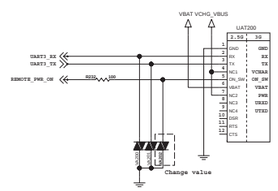
eMMC 2G



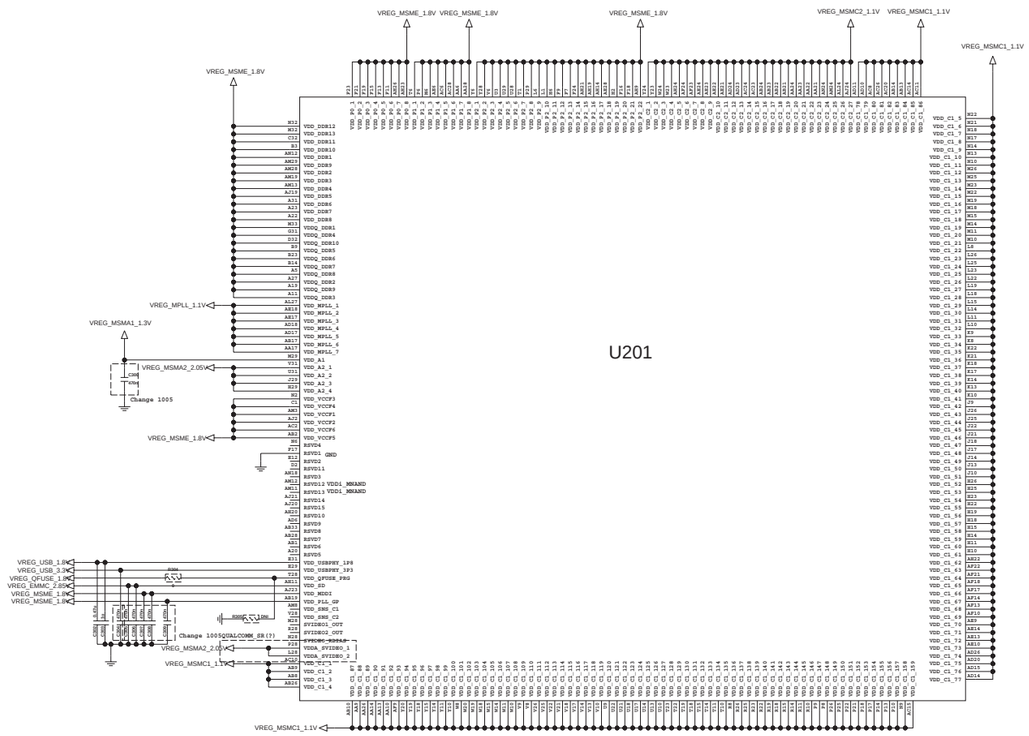
4Gb DDR1 (POP)

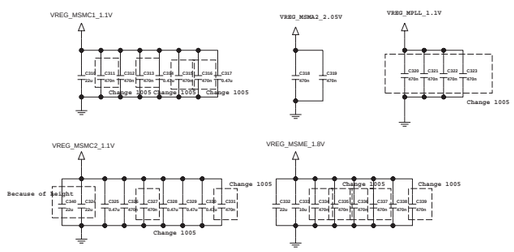
Need to chage to shrink ver.

ARRAY TP

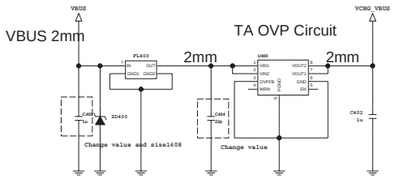


MSM8255-1_POWER

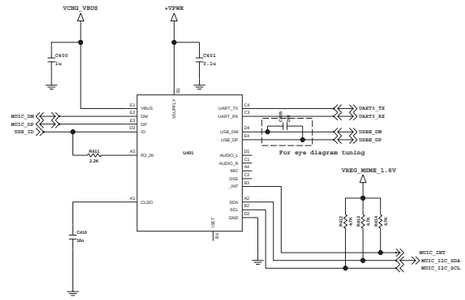




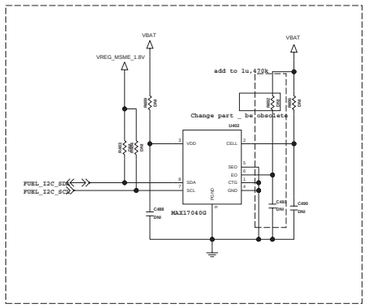
u-USB Connector



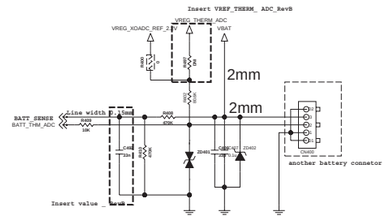
MUIC



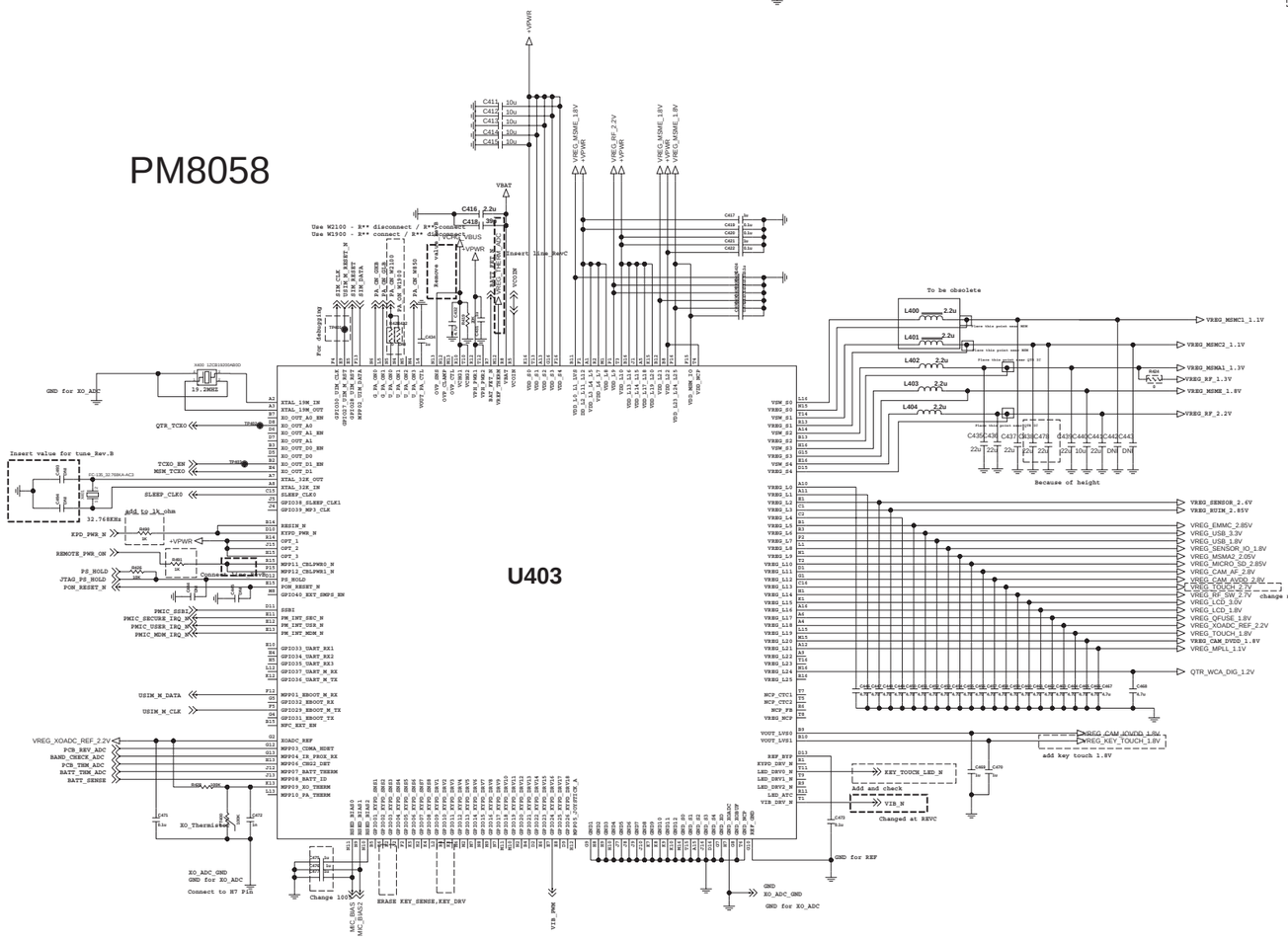
Fuel Gauge IC



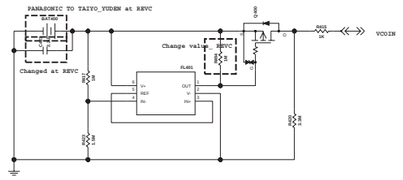
Battery Conn.



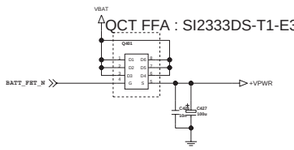
PM8058



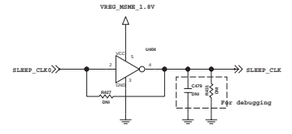
Backup Battery



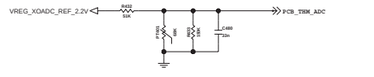
Battery Charging Circuit



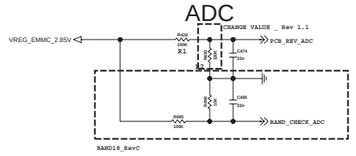
BUFFER FOR CLK



Temp Check



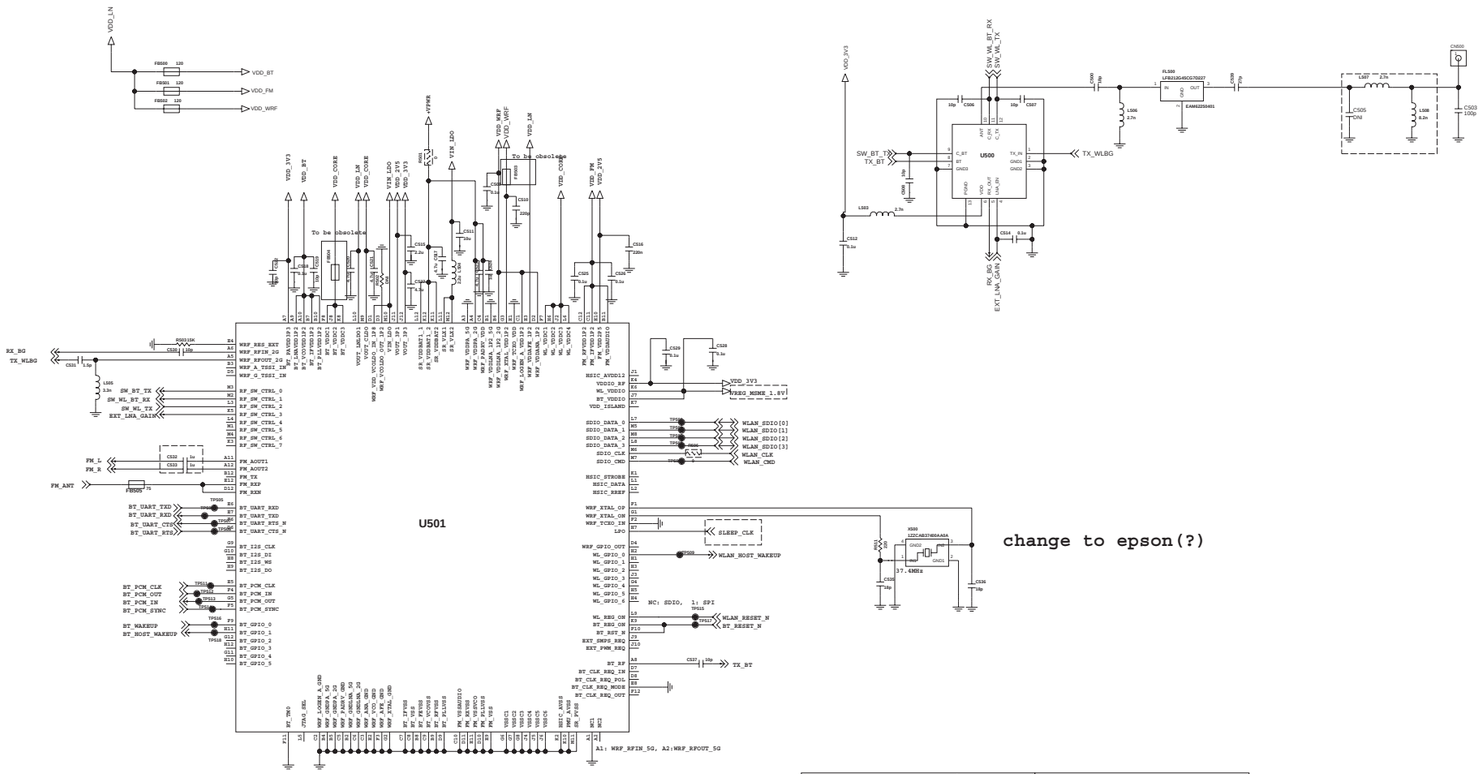
PCB Revision / Band Check



Revision	R1	R2	ADC Range(HEX.)
A	100K	5.6K	00.16
B	100K	12K	17.25
C	100K	19.1K	26.34
D	100K	27K	35.42
E	100K	36K	43.51
F	100K	47K	52.5E
1.0	100K	100K	83.95
1.1	100K	130K	96.A9

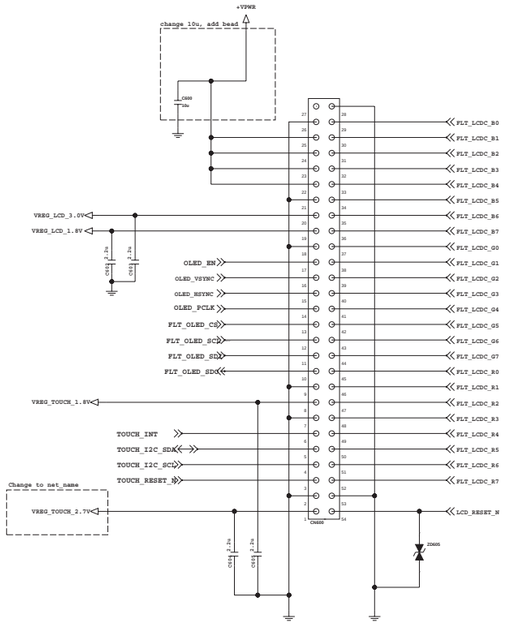
Band	R1	R2	ADC Range(HEX.)
1/5	100K	300K	2.14
1/8	100K	10K	17.25

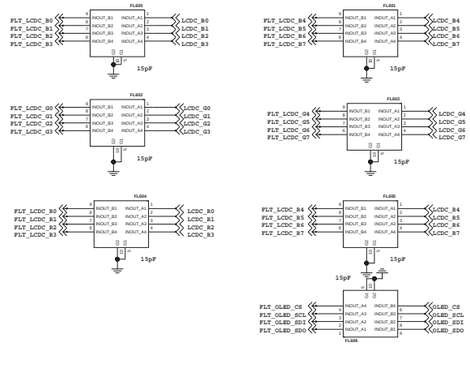
BCM4330_2.4GHz(QCT & IFX Only)_COB_With FM RX_Ver0.1



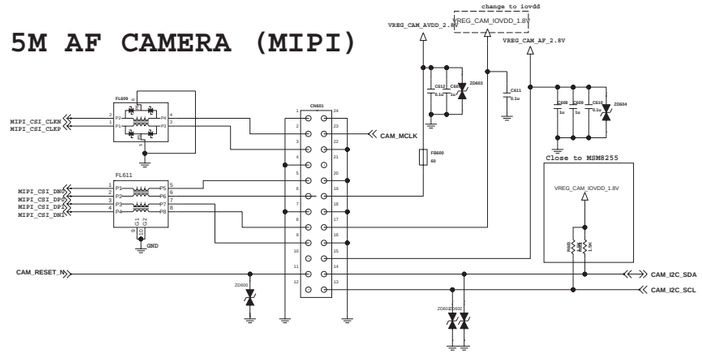
VBAT	QCT	VBAT
	IFX	VBAT
VBT_WIFI_IO_2V6	QCT	VREG_MSMP_2V6
	IFX	VPM_IO_2V62

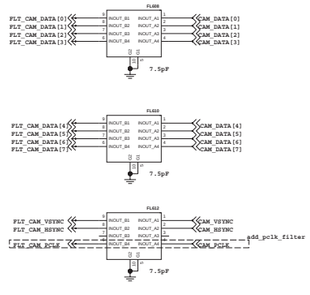
3.8" WVGA AMOLED Conn.



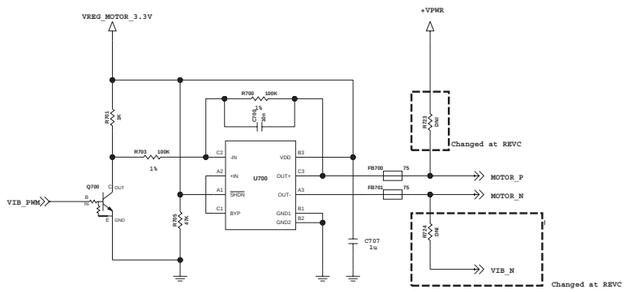


5M AF CAMERA (MIPI)

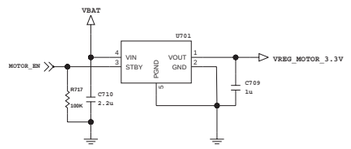




Q-coin MOTOR

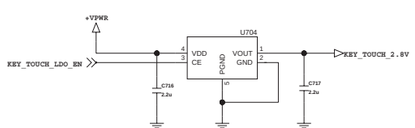


MOTOR 3.3V LDO

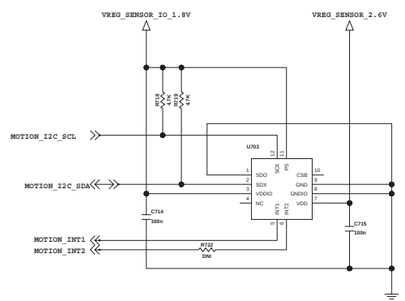


Add key touch LDO

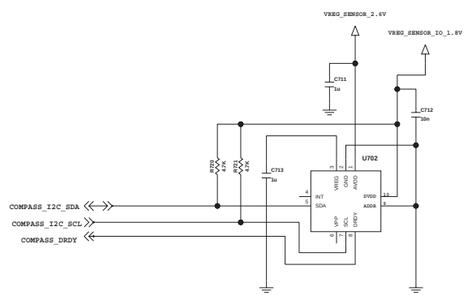
KEY TOUCH_2.8V_LDO



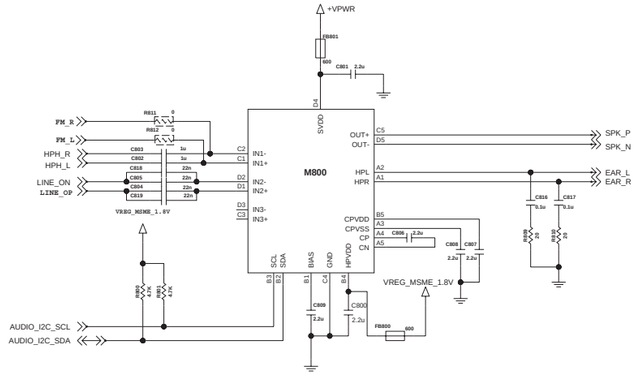
Acceleration Sensor



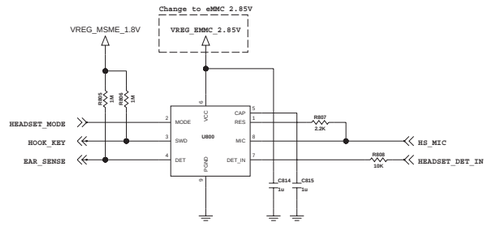
Digital Compass



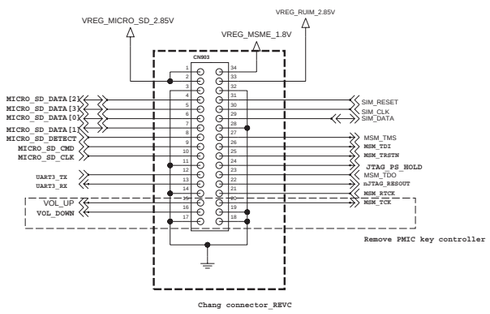
Audio SUB SYSTEM



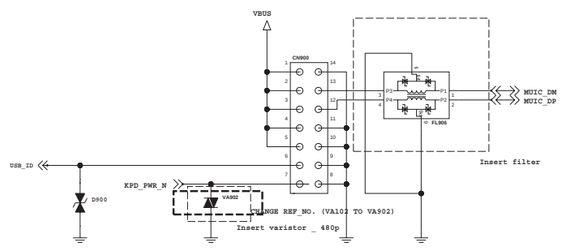
HEADSET_DETECT



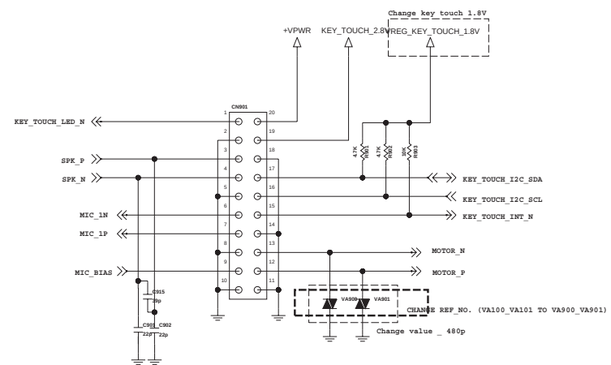
CARD FPCB Conn



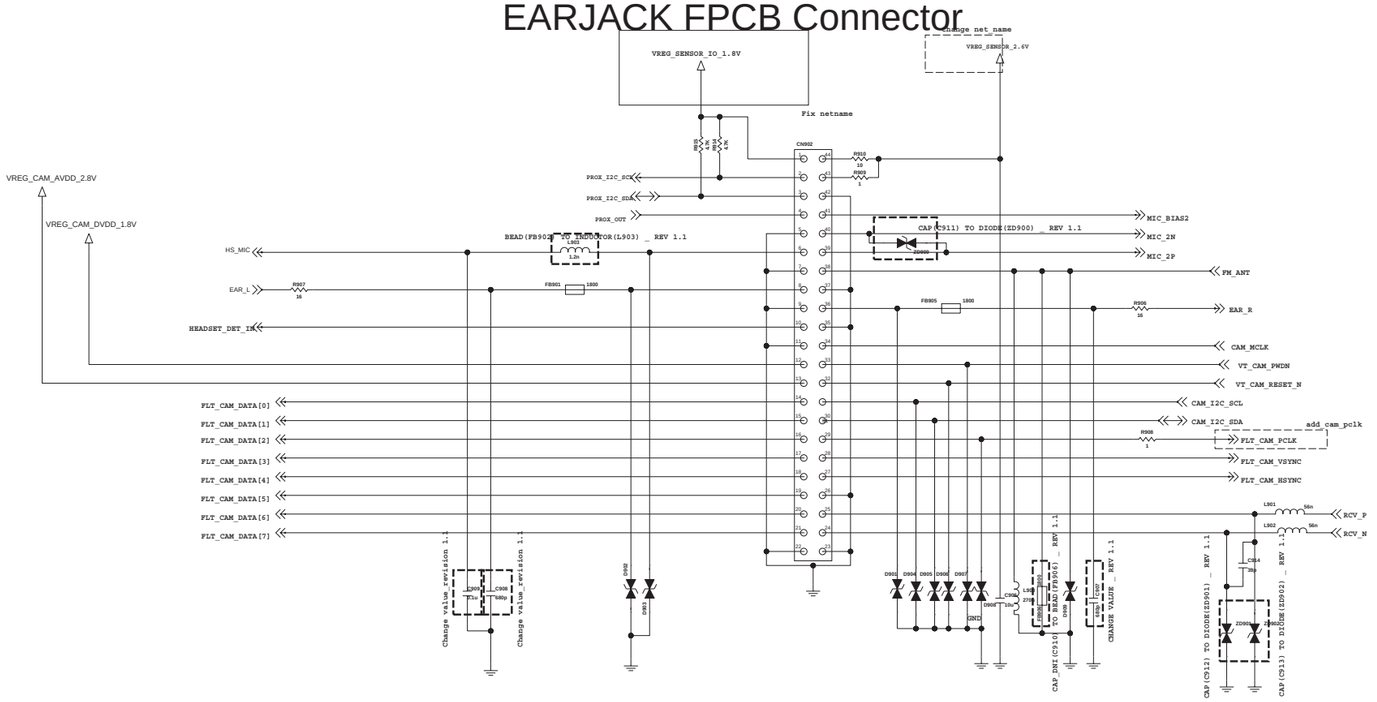
USB FPCB Conn



TOUCH FPCB Conn

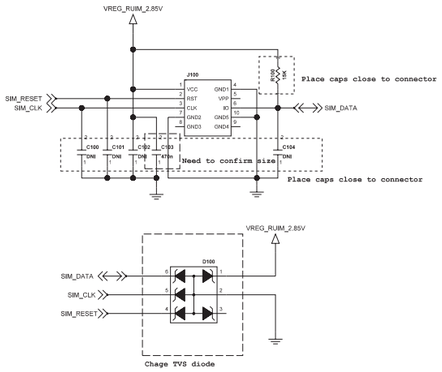


EARJACK FPCB Connector

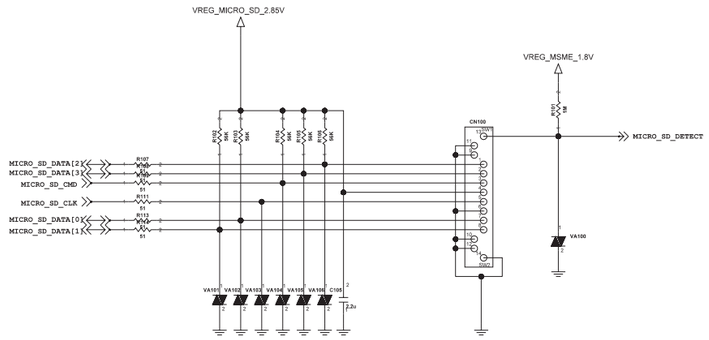


CARD FPCB

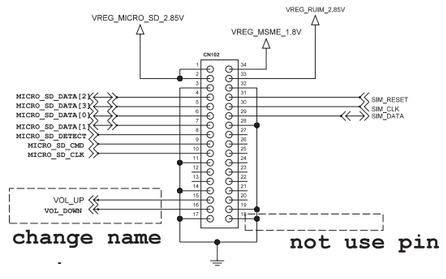
USIM Socket



Micro-SD Socket



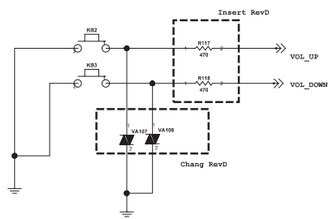
CARD FPCB CONNECTOR



ARM11&Scorpion JTAG

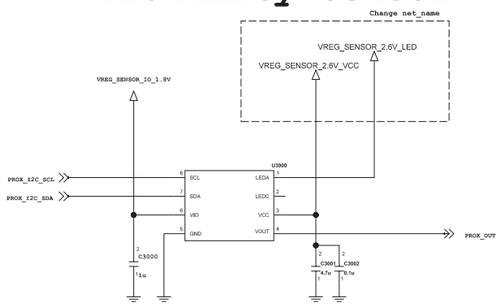
DELETE ALL COMPONENT _ REV 1.1

VOLUME SIDE KEY

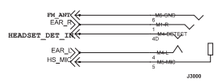


Ear Jack_FPCB

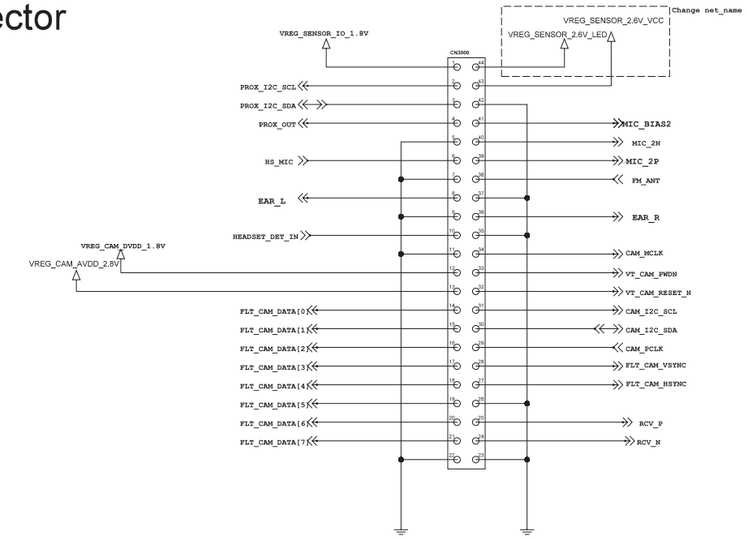
Proximity Sensor



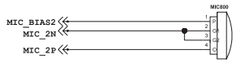
3.5pi Ear Jack Connector



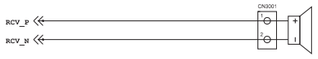
EARJACK FPCB Connector



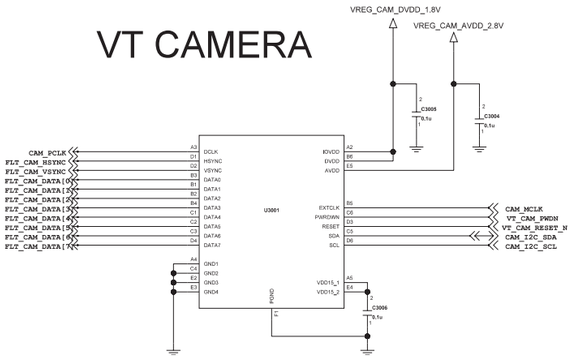
Microphone_02



Receiver

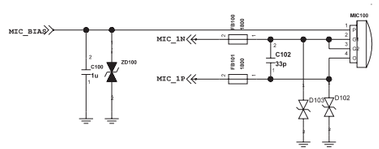


VT CAMERA



Antenna_FPCB

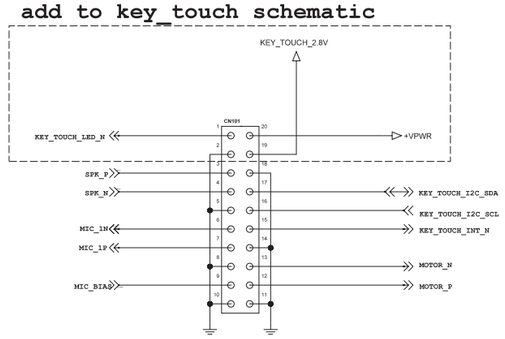
MICROPHONE_1



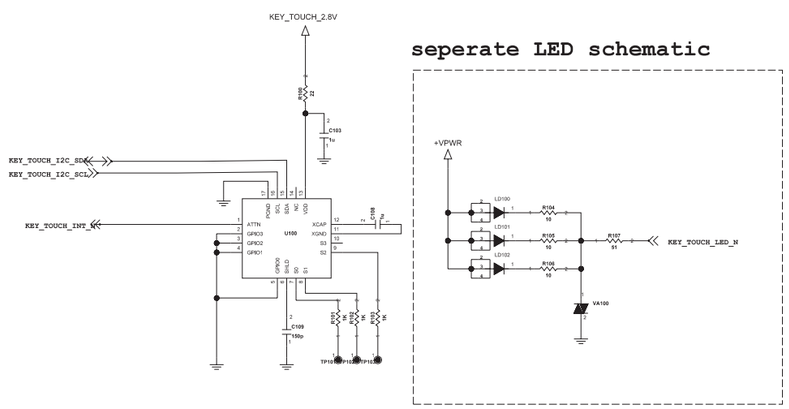
SPEAKER

CONNECTOR

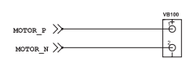
add to key_touch schematic



KEY_TOUCH

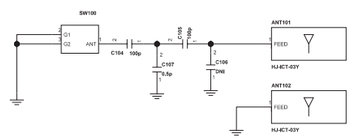


MOTOR

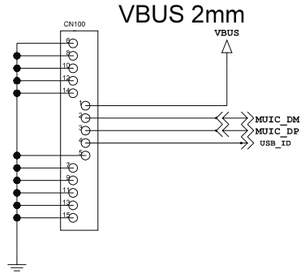


-

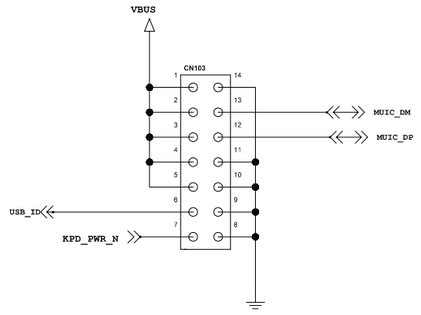
Main Antenna



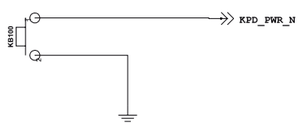
5PIN USB SOCKET



USB FPCB CONN

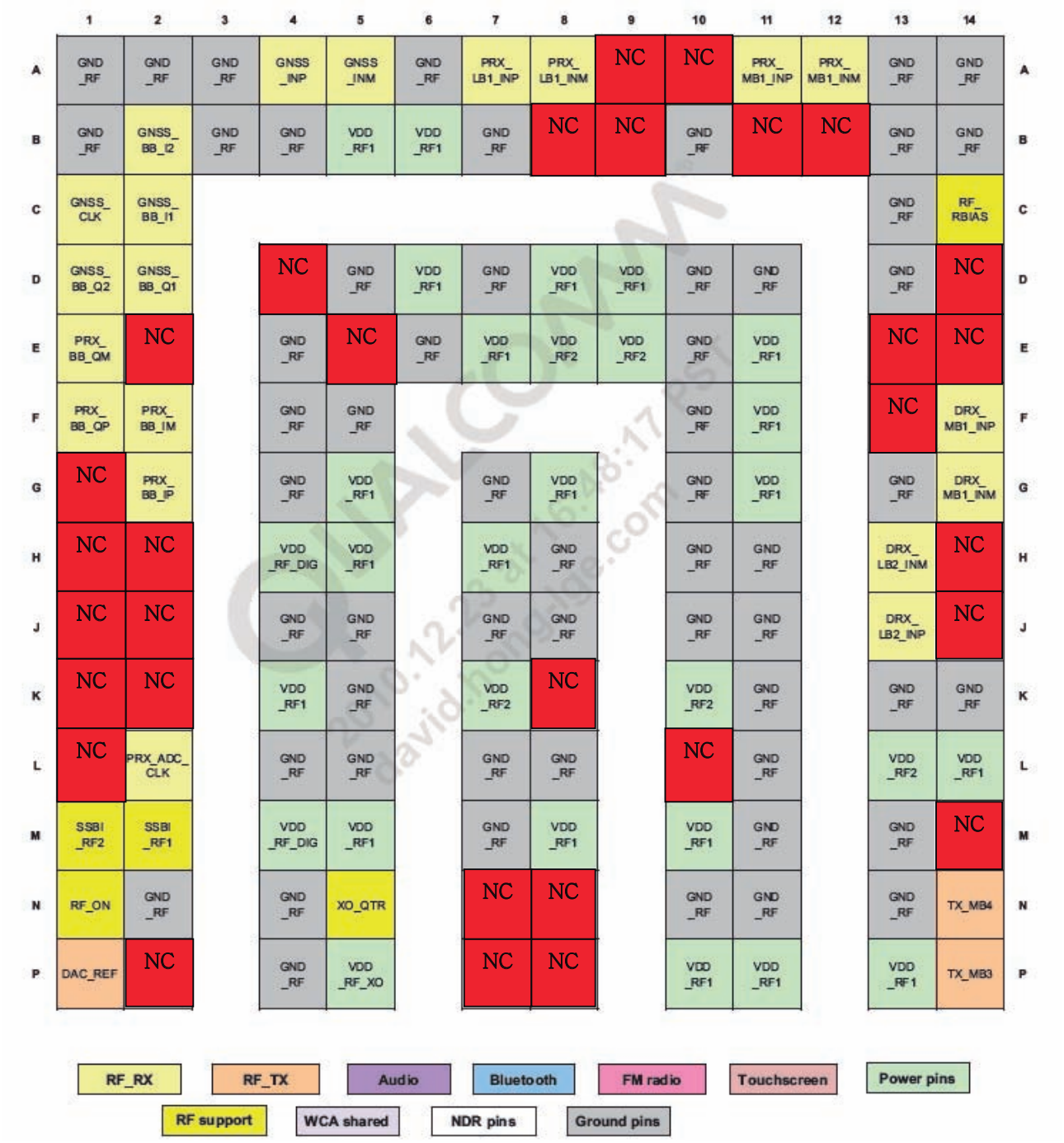


POWER KEY



8. BGA PIN MAP

QTR8200 (U1001)



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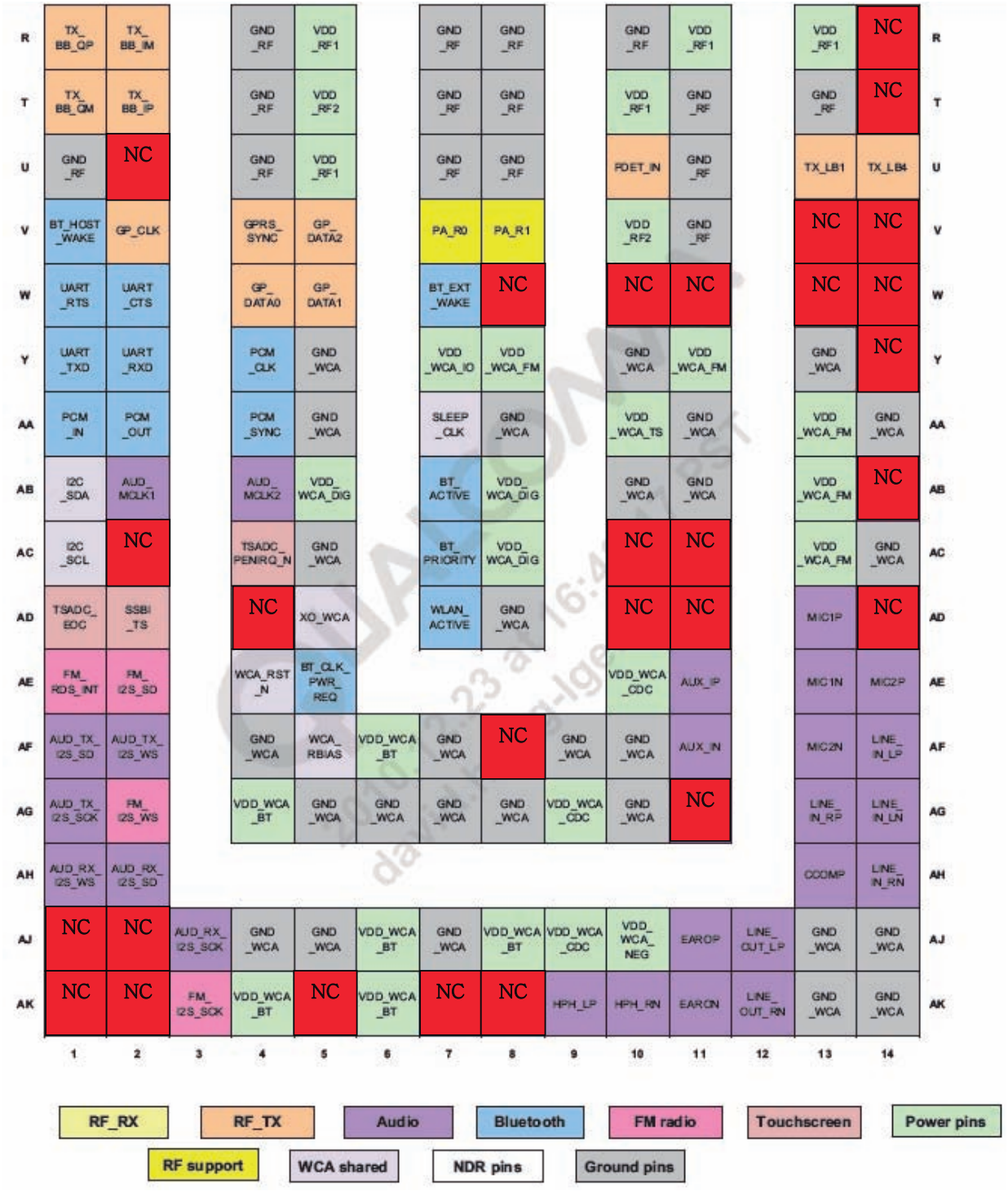


: Not Use

BCM4330 (U501)

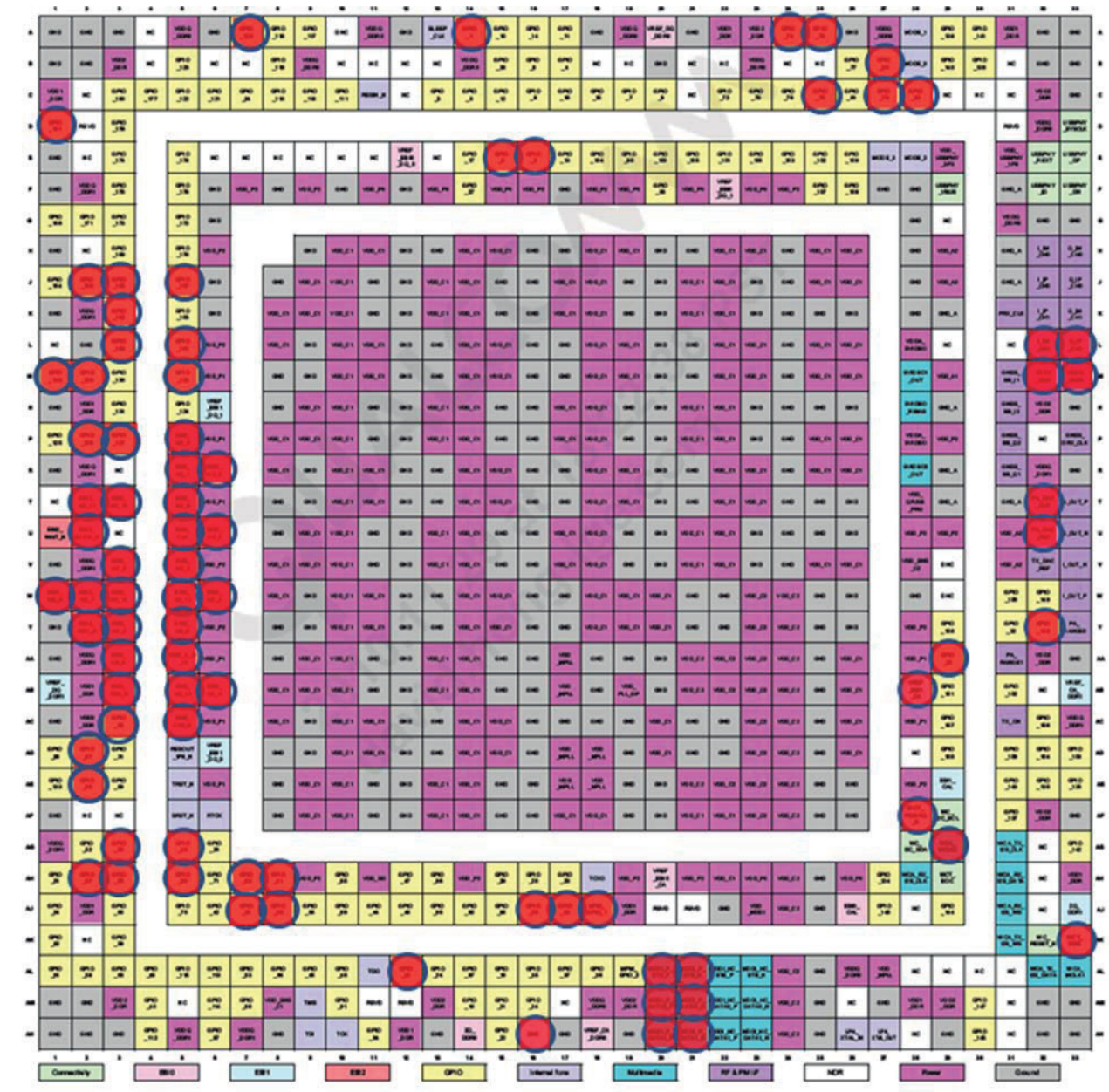
	1	2	3	4
A	N/C	NC	WRF_VDDPA_5G	WRF_VDDPA_2G
B	WRF_VDDLNA_1P2_5G	WRF_GNDLNA_5G	NC	WRF_GNDPA_5G
C	WRF_LOGEN_A_VDD1P2	WRF_LOGEN_A_GND	WRF_ANA_GND	WRF_PADRV_VDD
D	WRF_VDD_VCOLDO_IN_1P8	WRF_VDDANA_1P2	WRF_VCOLDO_OUT_1P2	WRF_GPIO_OUT
E	WRF_TCXO_VDD	WRF_VCO_GND	WRF_VDDAFE_1P2	WRF_RES_EXT
F	WRF_XTAL_OP	WRF_TCXO_IN	WRF_AFE_GND	BT_PCM_IN
G	WRF_XTAL_ON	WRF_XTAL_GND	WRF_XTAL_VDD1P2	NC
H	NC	WL_GPIO_0	NC	NC
J	NC	WL_VDDC	NC	VSSC
K	NC	HSIC_AVSS	NC	VDDIO_RF
L	NC	NC	RF_SW_CTRL_2	NC
M	NC	RF_SW_CTRL_1	RF_SW_CTRL_0	NC

	5	6	7	8
A	WRF_RFOUT_2G	WRF_RFIN_2G	BT_PAVDD3P3	BT_RF
B	WRF_GNDPA_2G	WRF_VDDLNA_1P2_2G	BT_IFVDD1P2	BT_FEVSS
C	WRF_PADRV_GND	WRF_GNDLNA_2G	BT_IFVSS	BT_VSS
D	NC	BT_UART_CTS_N	NC	NC
E	BT_PCM_CLK	BT_UART_RXD	BT_UART_TXD	BT_CLK_REQ_MODE
F	BT_PCM_SYNC	BT_UART_RTS_N	WL_VDDC	BT_VDDC
G	BT_PCM_OUT	VSSC	VSSC	VSSC
H	NC	WL_VDDC	LPO	NC
J	VSSC	VSSC	BT_VDDIO	BT_VDDC
K	RF_SW_CTRL_3	WL_VDDIO	NC	BT_VDDC
L	NC	WL_VDDC	SDIO_DATA_0	SDIO_DATA_3
M	SDIO_DATA_1	SDIO_CLK	SDIO_CMD	SDIO_DATA_2

	9	10	11	12
A	BT_LNAVDD1P2	BT_VCOVDD1P2	FM_AOUT1	FM_AOUT2
B	BT_RFVSS	BT_PLLVDD1P2	FM_VDDAUDIO	NC
C	BT_VCOVSS	FM_VSSAUDIO	FM_IFVDD1P2	FM_RFVDD_1P2
D	BT_PLLVSS	FM_PLLVSS	FM_RFVSS	FM_RXN
E	FM_VSS	FM_VDD2P5	FM_VSSVCO	FM_RXP
F	BT_GPIO_0	BT_RST_N	BT_TM0	NC
G	NC	NC	NC	BT_GPIO_2
H	NC	NC	BT_GPIO_1	NC
J	NC	NC	VOUT_3P1	VOUT_3P3
K	NC	PMU_AVSS	SR_VDDBAT2	SR_VDDBAT1
L	NC	VOUT_LNLDO1	SR_VLX	SR_VDDBAT1
M	VOUT_CLDO	VIN_LDO	SR_PVSS	SR_VLX

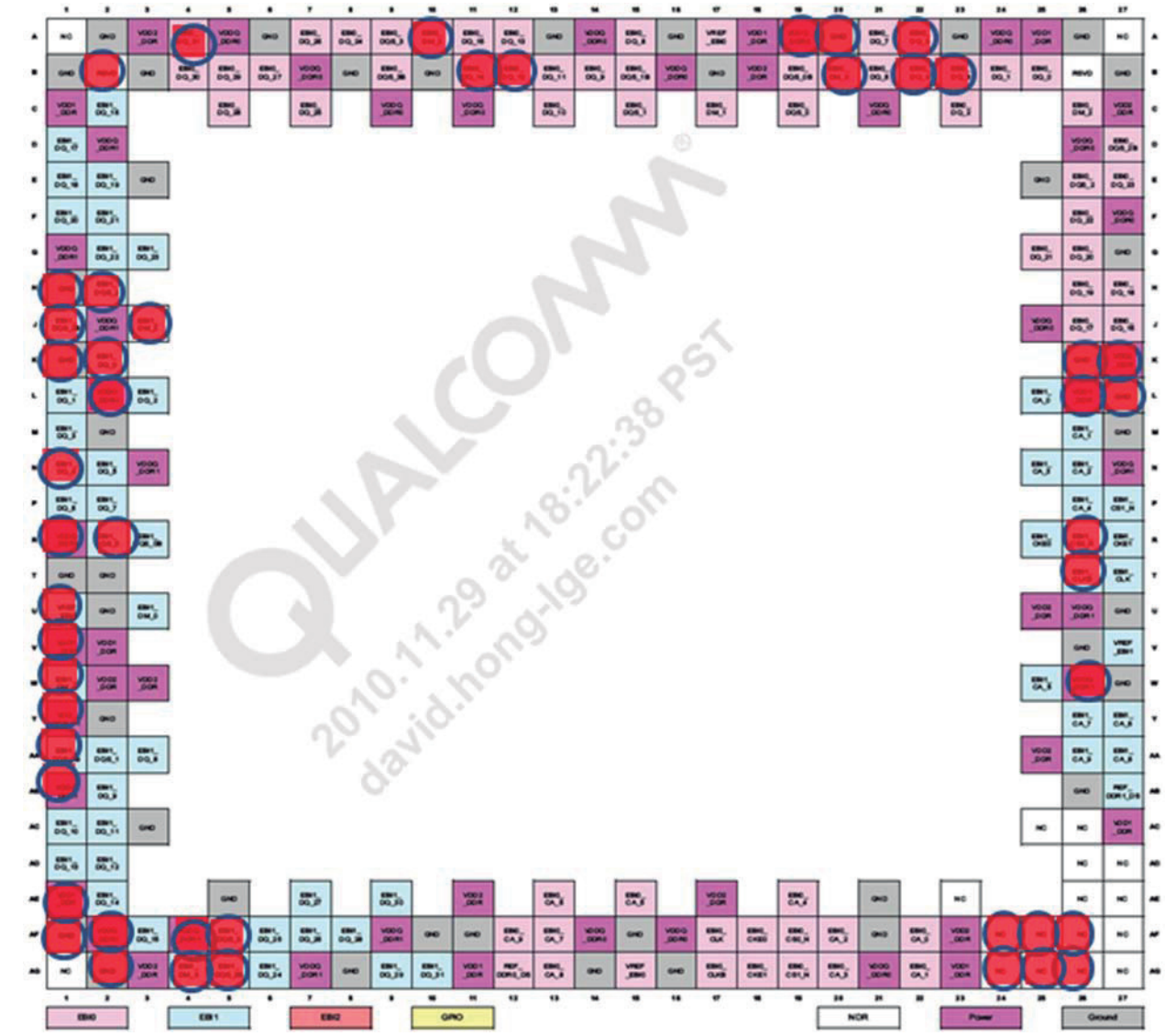
: Not Use

MSM8255 (U201)



: Not Use

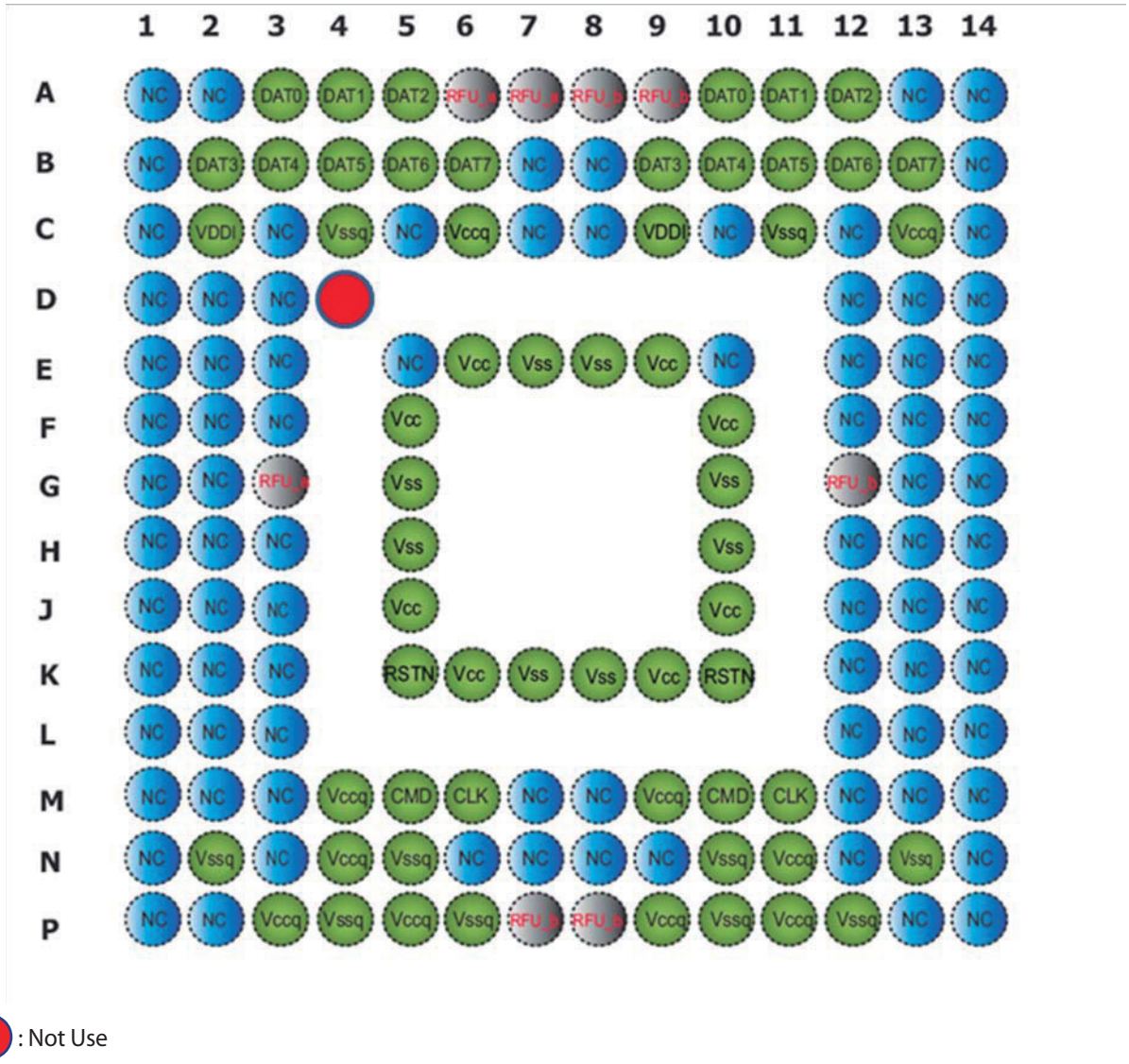
Figure 2-1. MSM8x55-0 IC bottom pin assignment



: Not Use

Figure 2-2. MSM8x55-0 IC top pin assignment (top view)

eMMC (U200)



: Not Use

Figure 3-1. FBGA153 package top pin assignment (top view)

POP memory (U202)

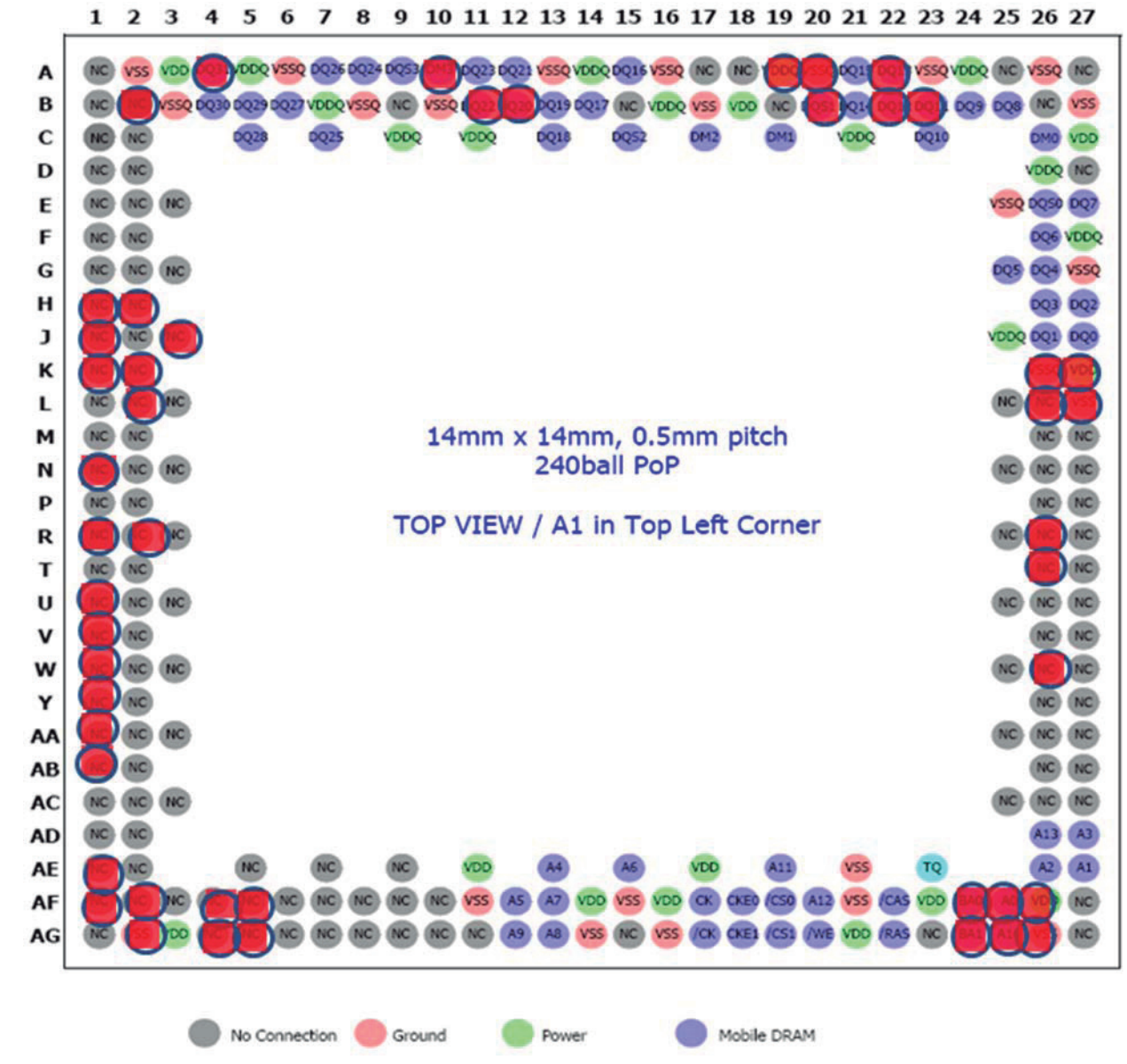
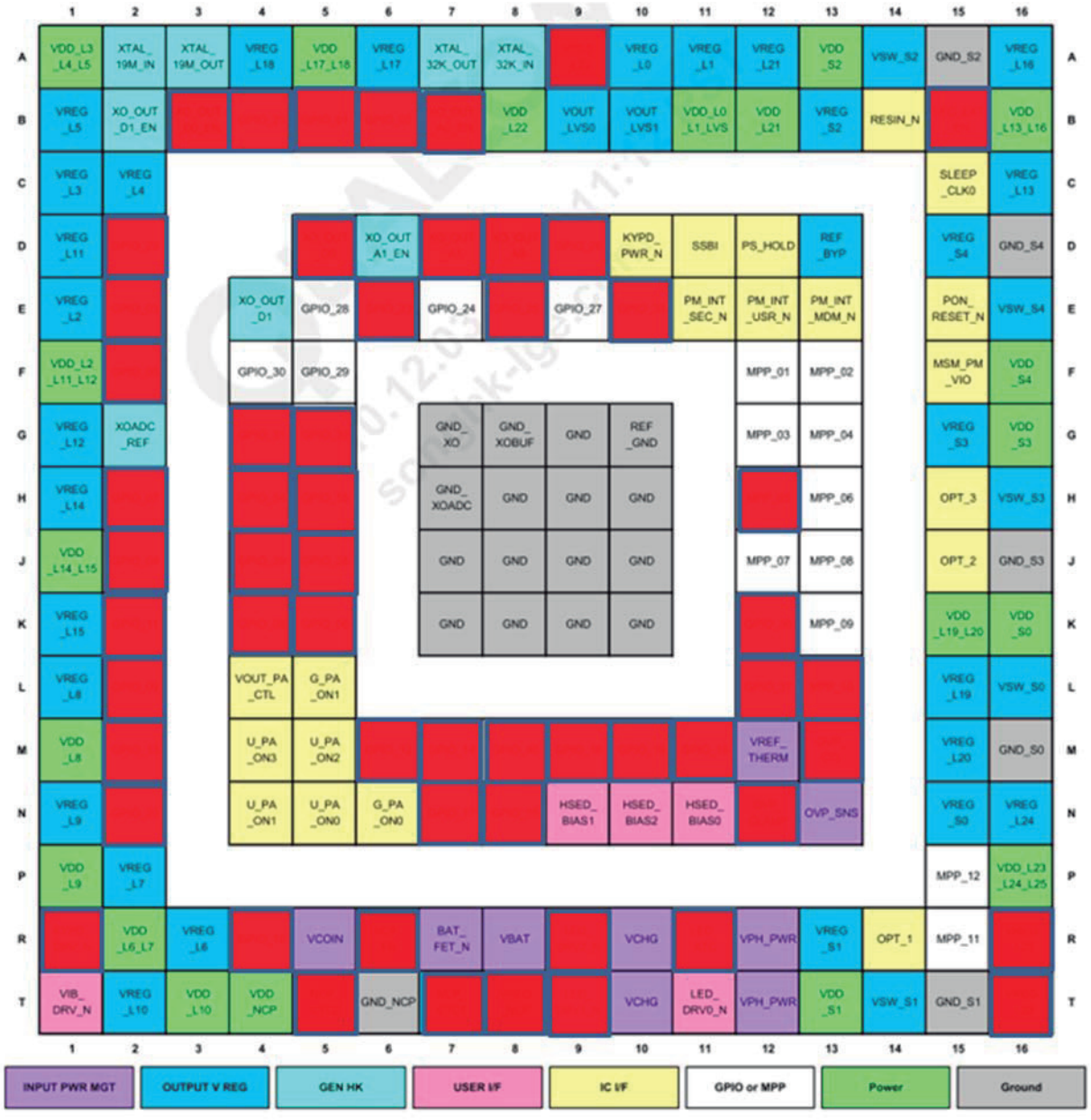


Figure 3-2. H8MBX00UOMRR series top pin assignment (top view)

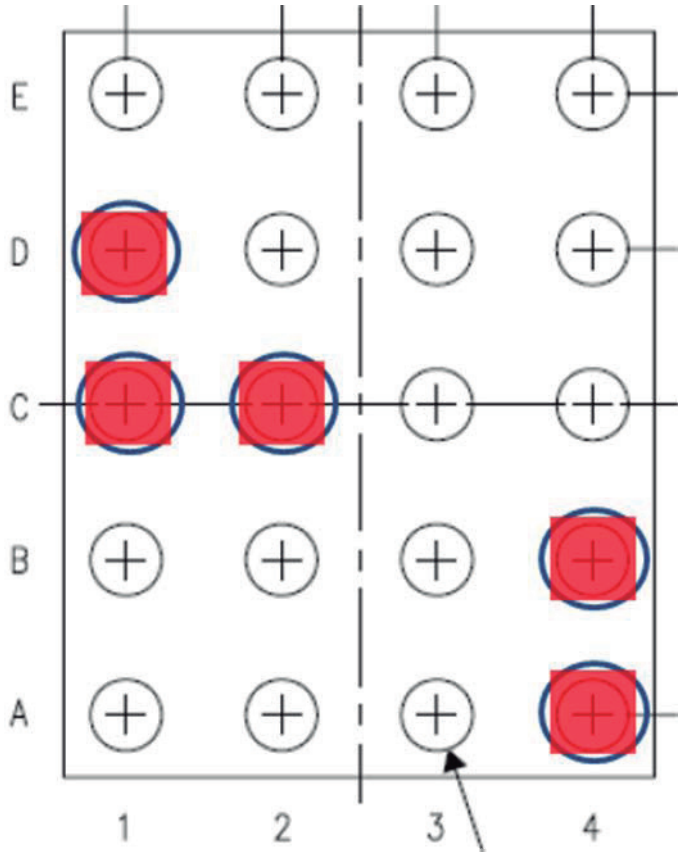
PM8058(U403)



: Not Use

Figure 3-2. H8MBX00UOMRR series top pin assignment (top view)

MUIC(U401)



	A	B	C	D	E
4	MIC	ISET	UART_TX	USB_DM	USB_DP
3	R2.2K	INT\	UART_RX	ID	DP
2	SDA	SCL	DSS	GND	DM
1	CLDO	V_{SUPPLY}	AUDIO_R	AUDIO_L	V_{BUS}

: Not Use

Figure 5. YZP package top pin assignment (top view)

Q-coin motor IC(U700)

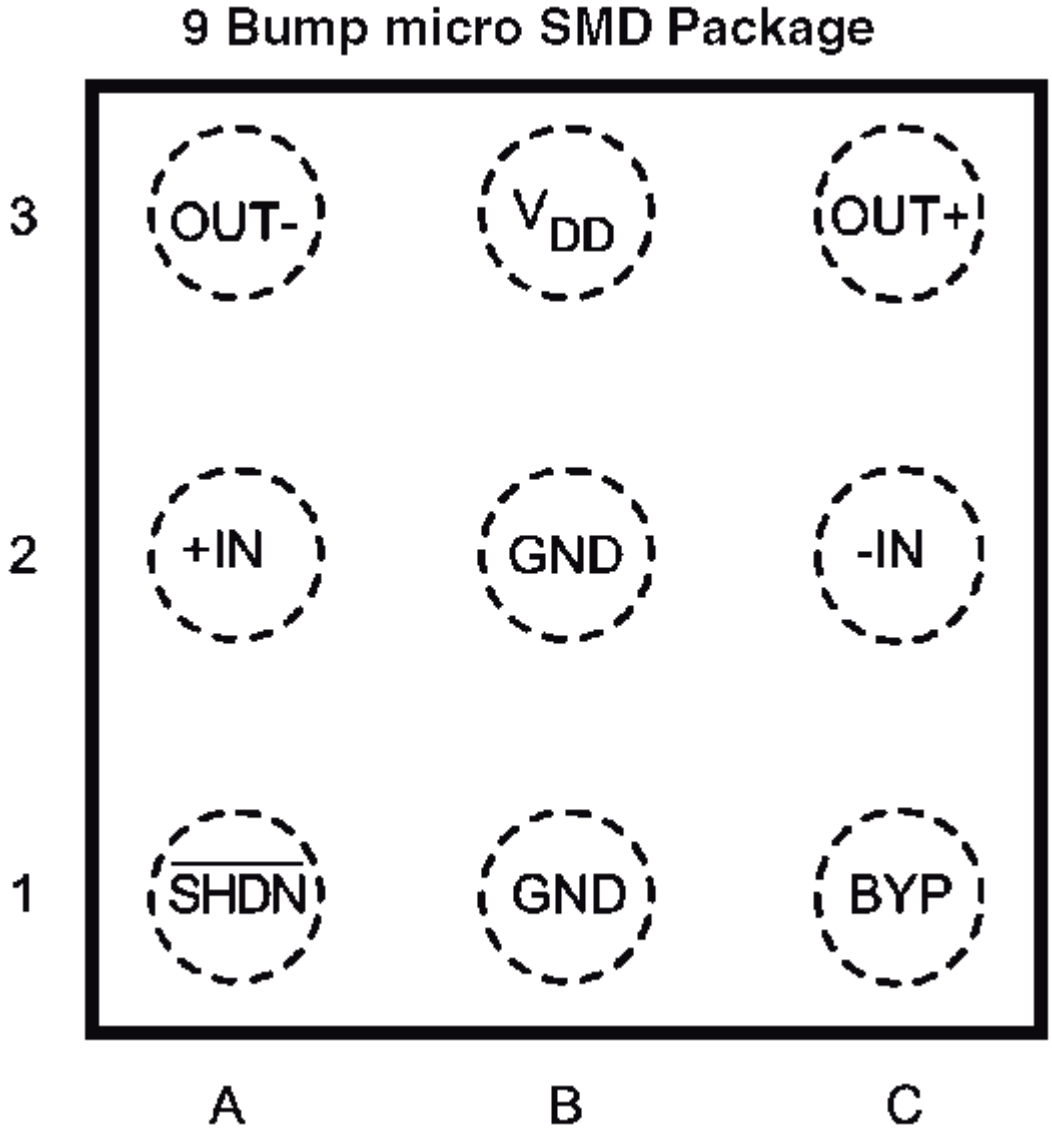
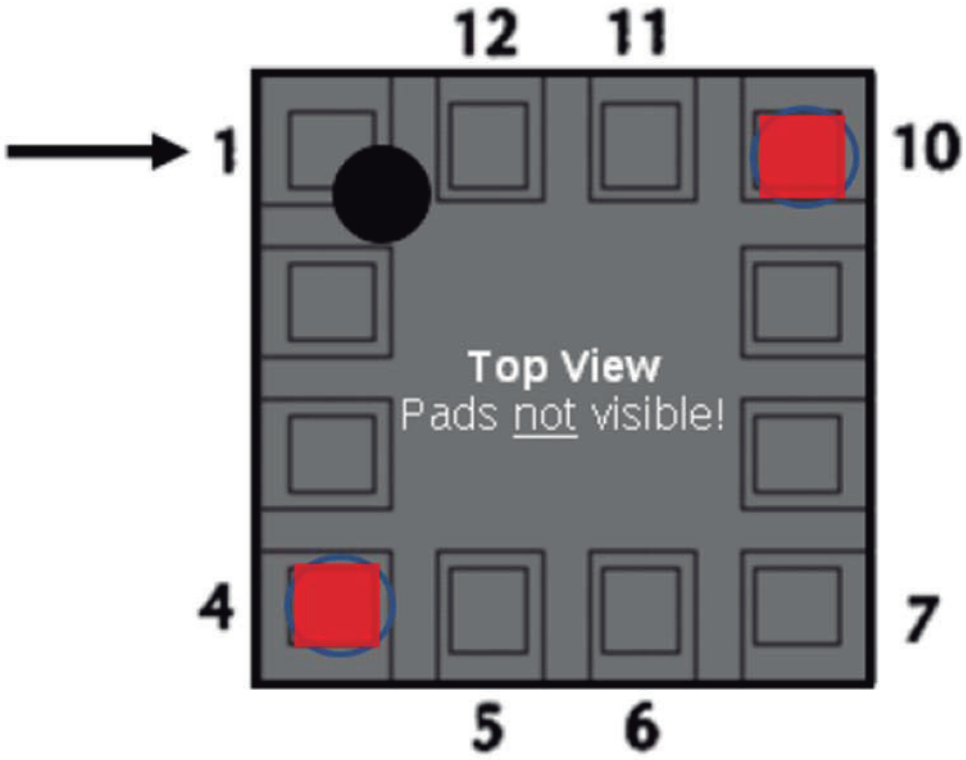


Figure 6. TMD09AAA top pin assignment (top view)

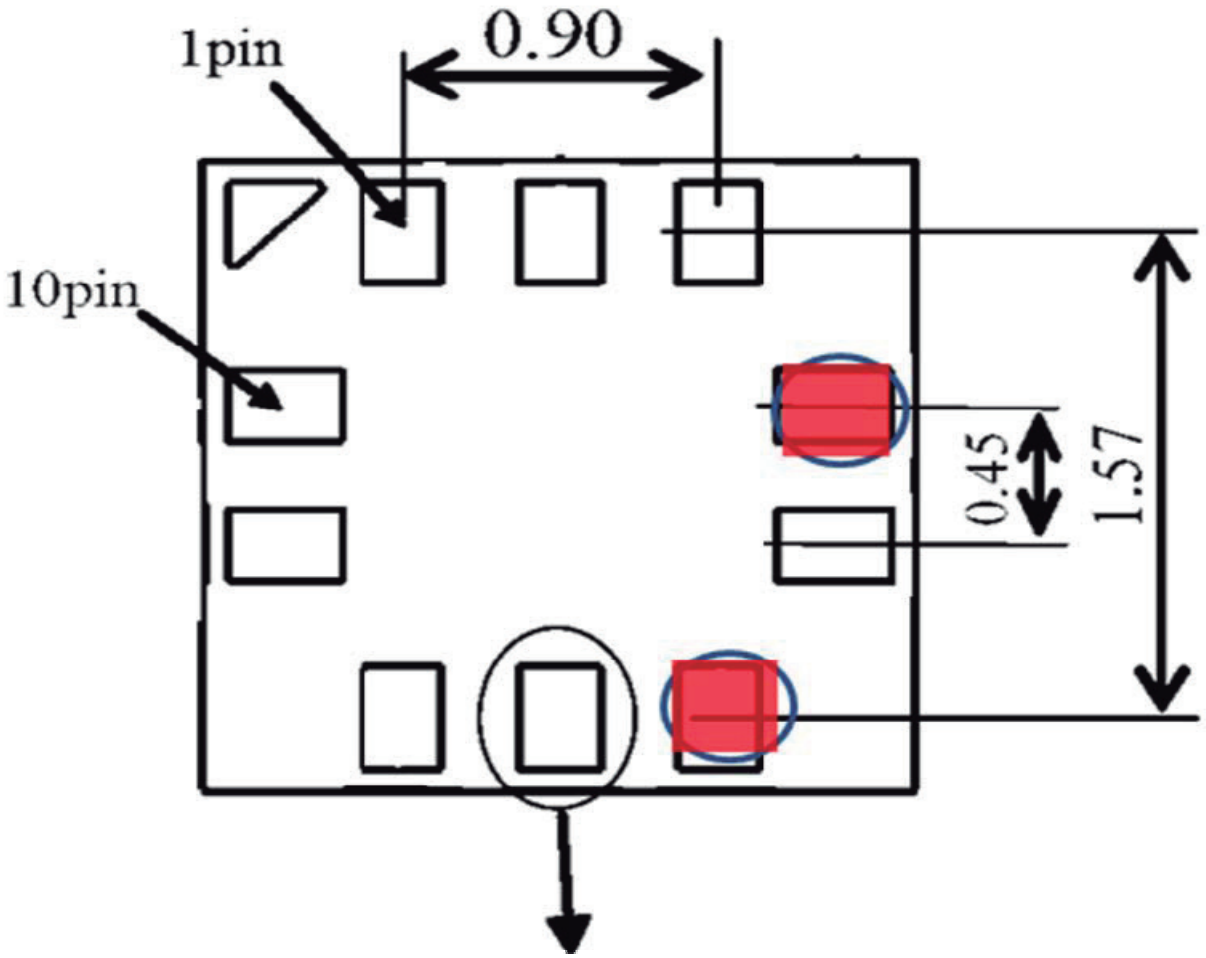
MUIC(U401)



: Not Use

Figure 7. MO-229 top pin assignment (top view)

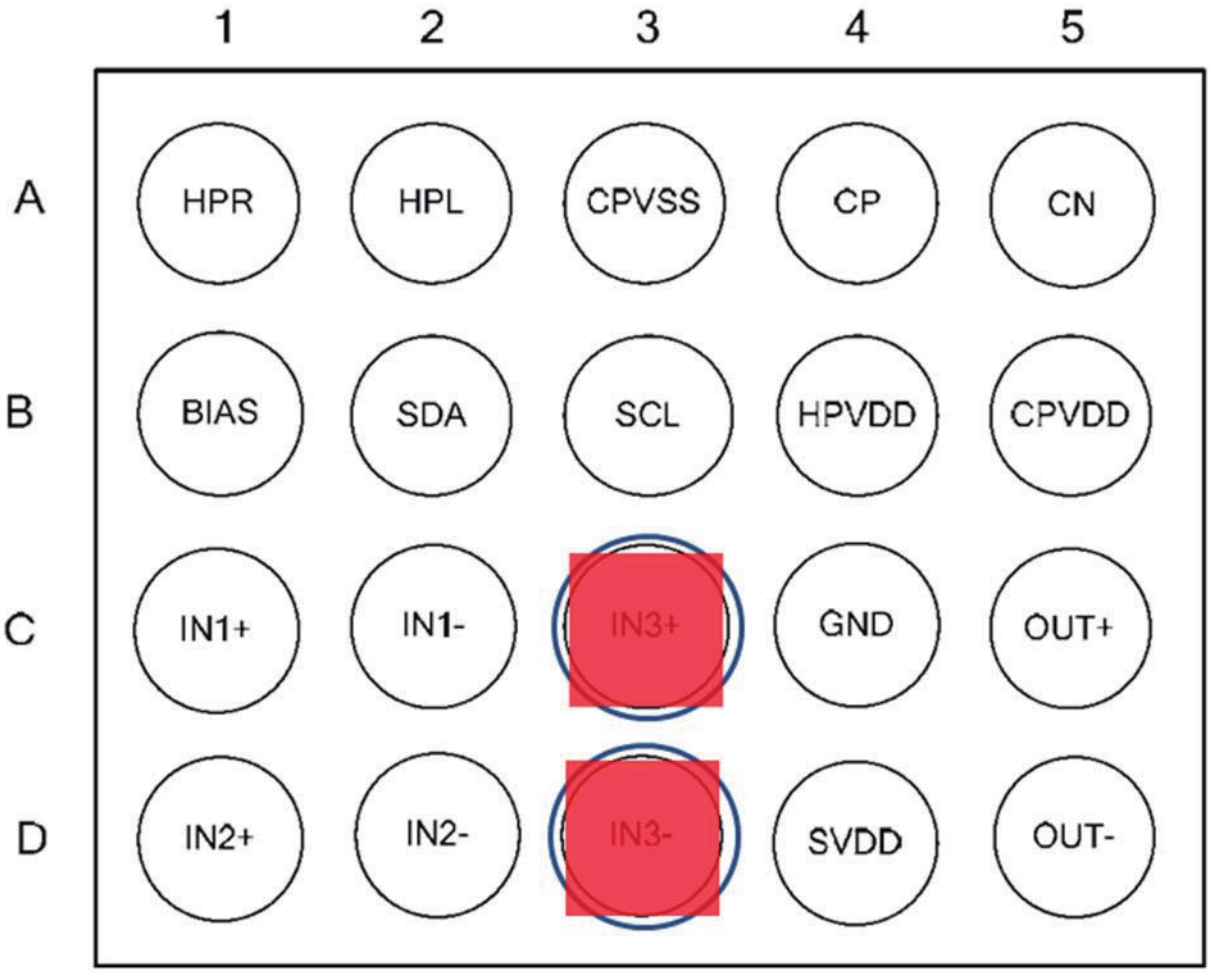
Compass sensor IC(U702)



: Not Use

Figure 8. AMI306 bottom pin assignment (bottom view)

Audio subsystem IC(M800)



: Not Use

Figure 9. W-CSP top pin assignment (top view)

Headset detect IC(U800)

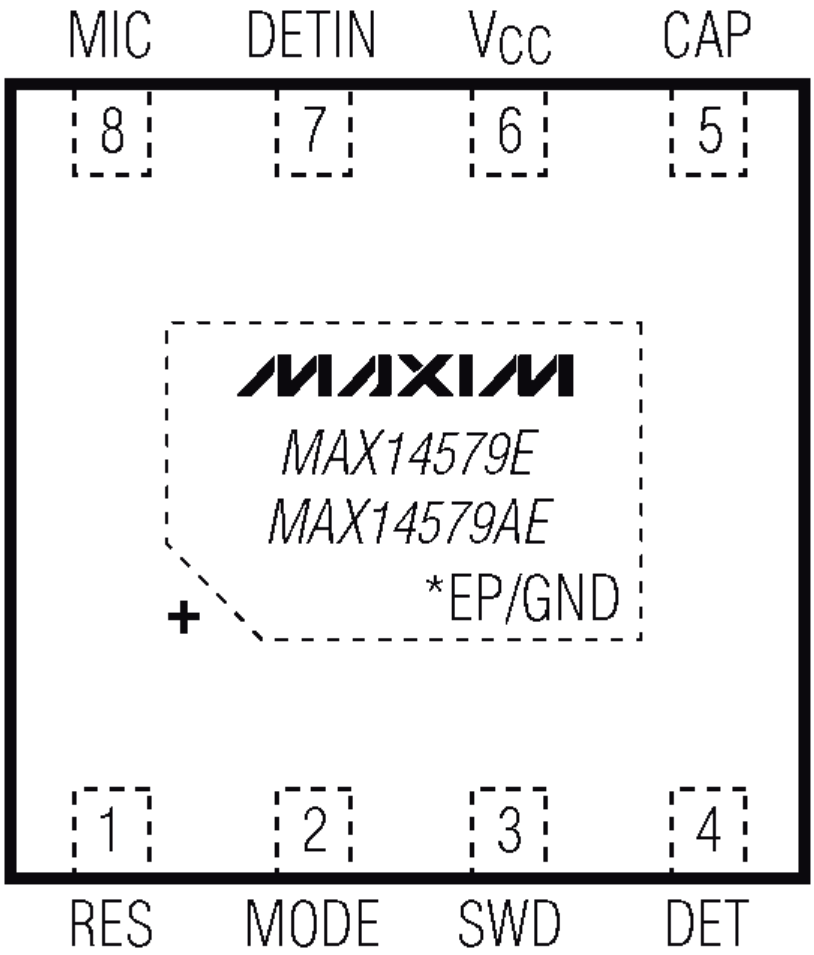


Figure 10. TDFN top pin assignment (top view)

9. PCB LAYOUT

X401: 32.768Mhz X-tal
- No Power On
- No Booting

X400: 19.2Mhz X-tal
- No Power On
- No Booting

U800: Headset detect
- No Ear-mic

M800: Audio system
- No sound

U200: EMMC memory
- No booting
- No Service

U403: PMIC
- No Booting
- No Power On
- No Service

U400: OTP IC
- No Booting
- No USB

U401: MUIC
- No Power On
- No Booting

U703: accerlation IC
- No accerlation

U202:POP memory(Top)
- No booting

U201: DBB(TOP)
- No booting
- No Power On
- No Servive

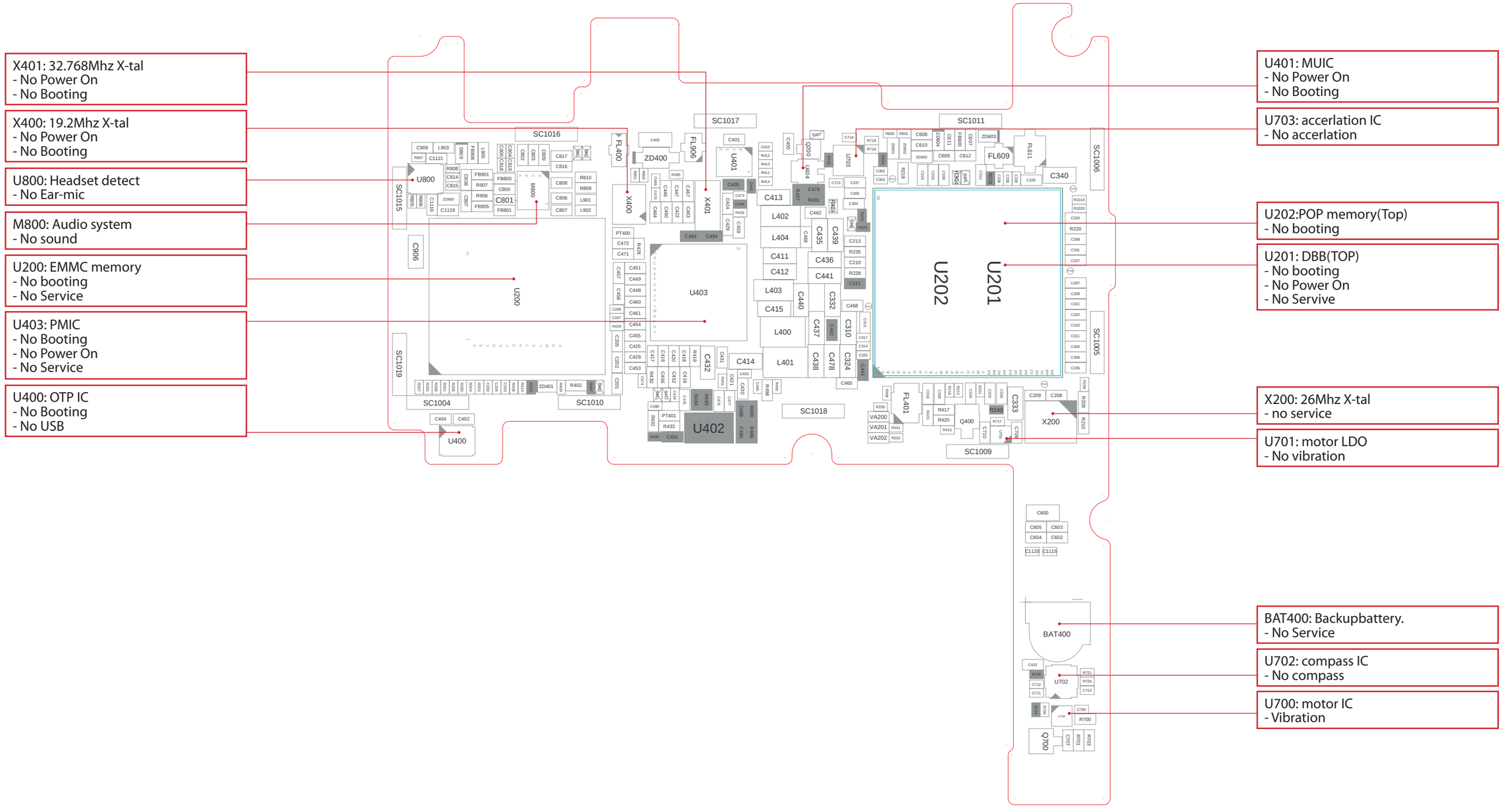
X200: 26Mhz X-tal
- no service

U701: motor LDO
- No vibration

BAT400: Backupbattery.
- No Service

U702: compass IC
- No compass

U700: motor IC
- Vibration



LG-E730_MAIN_EAX64266401_1.0_TOP

CN900: USB FPCB Conn.
- No Power on
- No USB

U1001: Transceiver
- No Service
- RF Sensitivity & TX Power

CN500: WiFi/BT Ant Conn.
- No WiFi/Bluetooth

CN601: 5M CAM Conn.
- No 5M camera

FL500: WiFi/BT Filter
- No Service

FL1001: Band1 TX SAW
- No Service

U500: WiFi/BT Switch
- No Service

U501: BT/WiFi/FM Chip
- No BT/WiFi/FM

X500: 37.4MHz X-tal.
- No BT
- No WiFi
- No FM

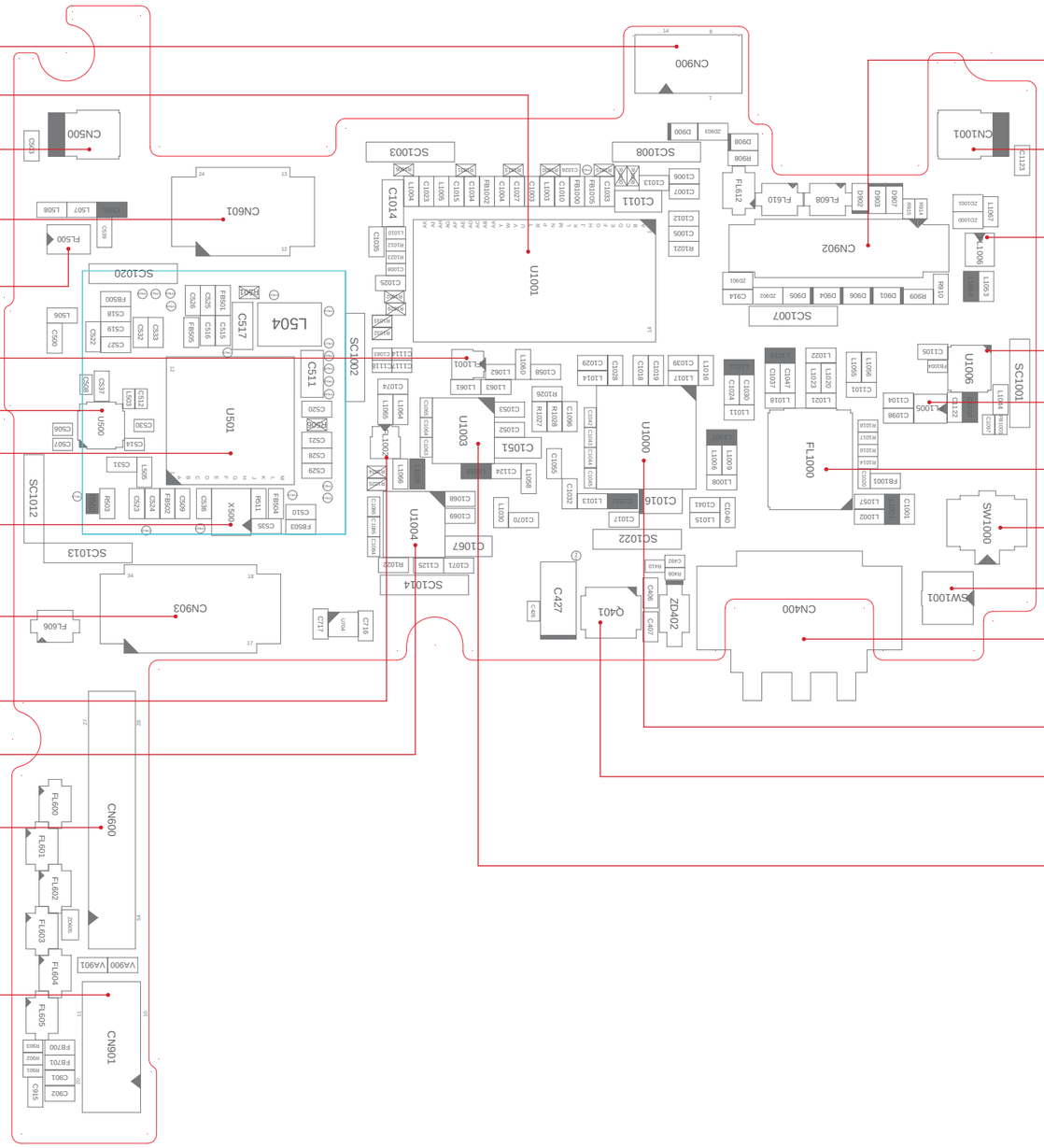
CN903: Sub FPCB Conn.
- No SIM
- No T-flash memory

FL1002: Band8 TA SAW
- No Service

U1004: PAM(Band8)
- No Service
- RF TX Power

CN600: AMOLED Conn.
- No display

CN901: Touch FPCB Conn.
- No LED
- No 1st Mic
- No speaker
- No Vibrator
- No Touch Key



CN902: Ear Jack FPCB Conn
- No Ear-jack
- No proximity sensor
- No FM radio
- No VT Cam
- No 2nd Mic
- No Receiver

CN1001: GPS Ant. Conn.
- No GPS

FL1006: GNSS SAW Filter
- No Service

U1006: GNSS LNA
- No GPS

FL1005: GNSS SAW Filter
- No Service

FL1000: FEM
- No Service
- RF Sensitivity & TX Power

SW1000: Coaxial Conn.
- No Service

SW1001: RF S/W
- No Service

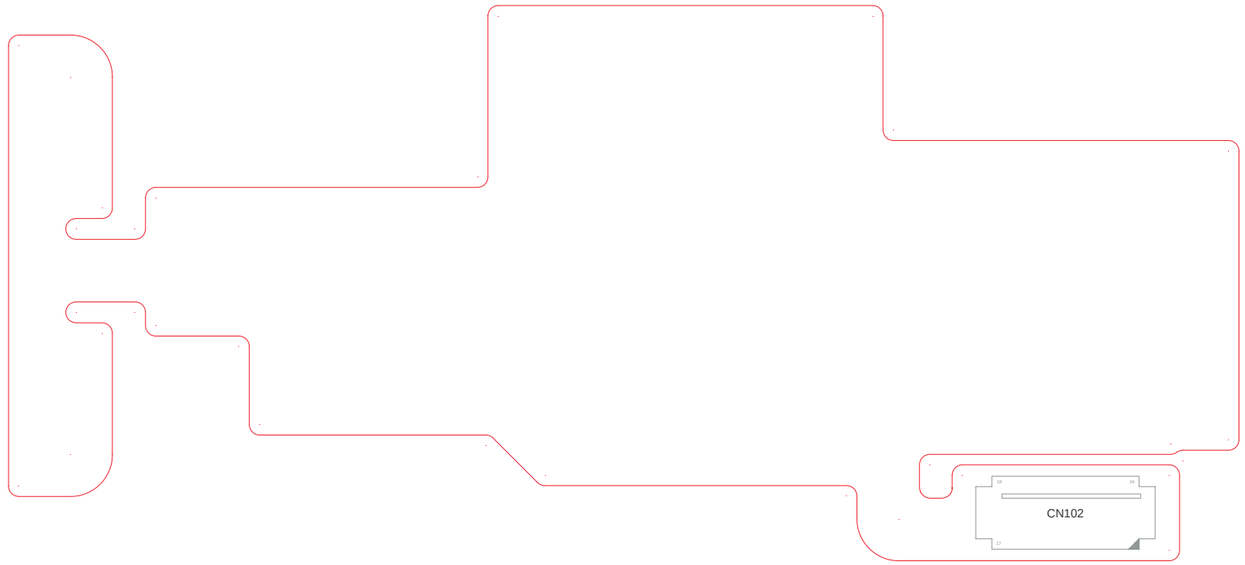
CN400: Battery Conn.
- No power On

U1000: GSM PAM
- No Service
- RF TX Power

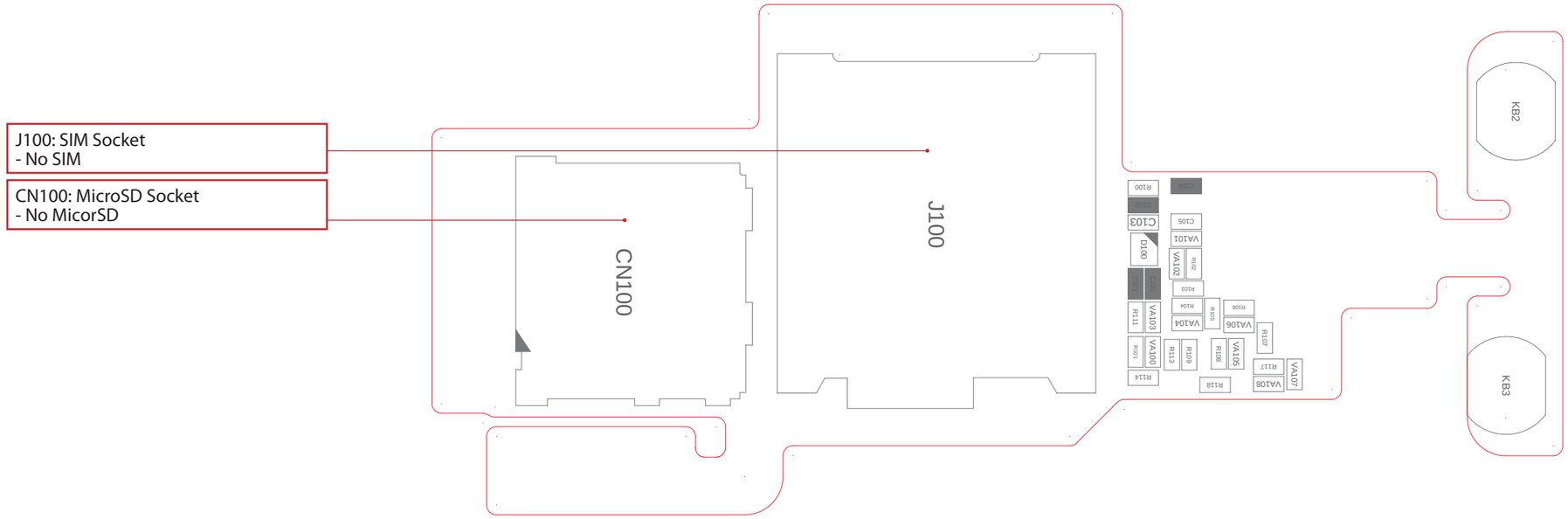
Q401: Battery Charging FET
- No Charging

U1003: PAM(Band1)
- No Service
- RF TX Power

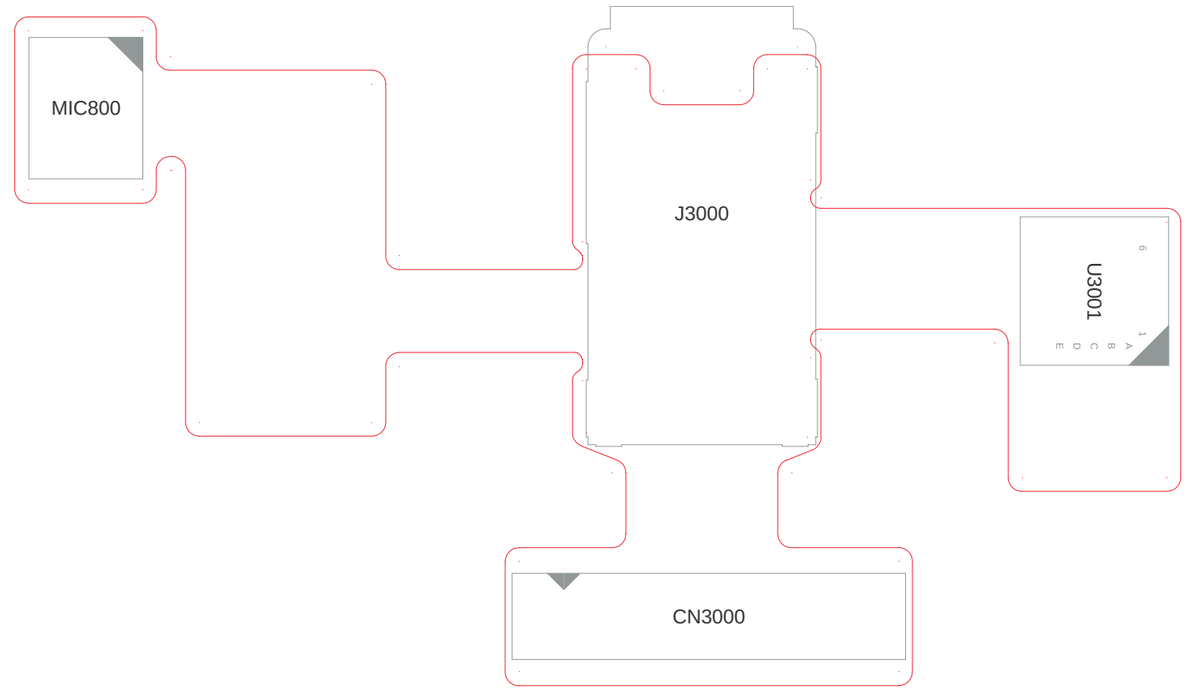
LG-E730_MAIN_EAX64266401_1.0_BOT



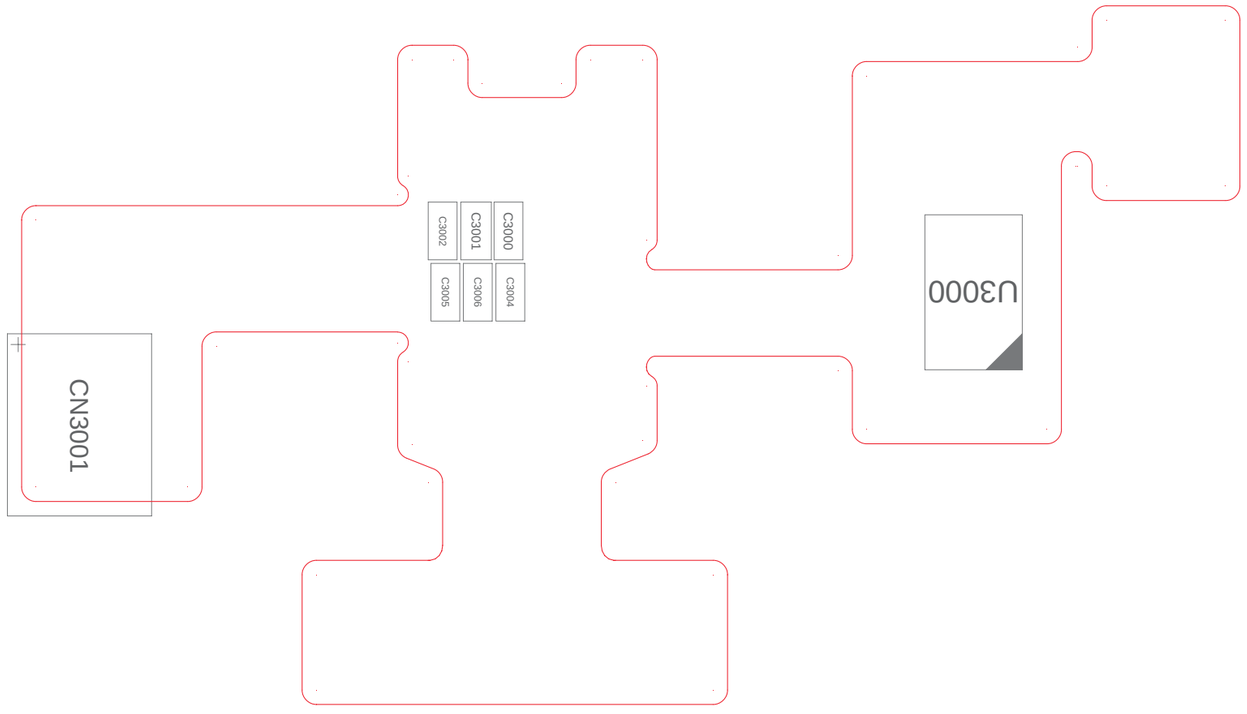
LG-E730_F_SUB_EAX64288001_1.1_TOP



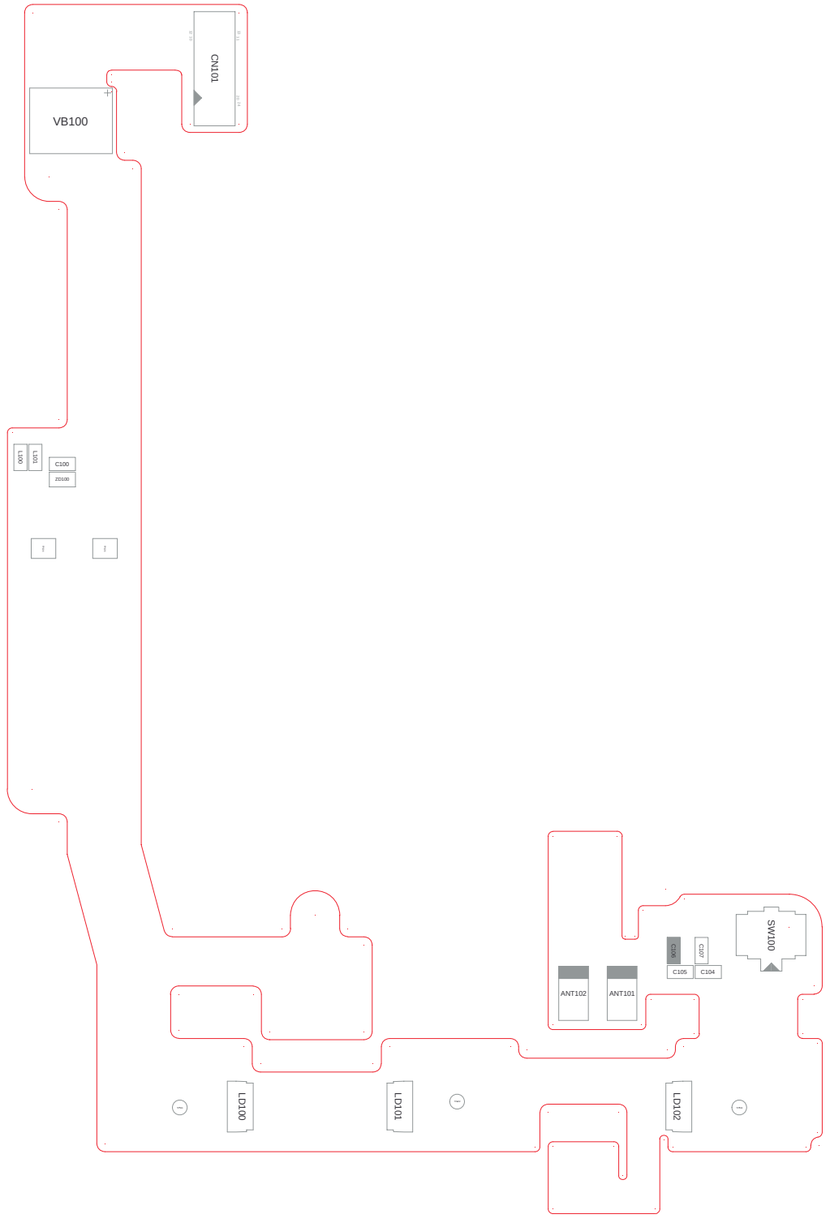
LG-E730_F_SUB_EAX64288001_1.1_BOT



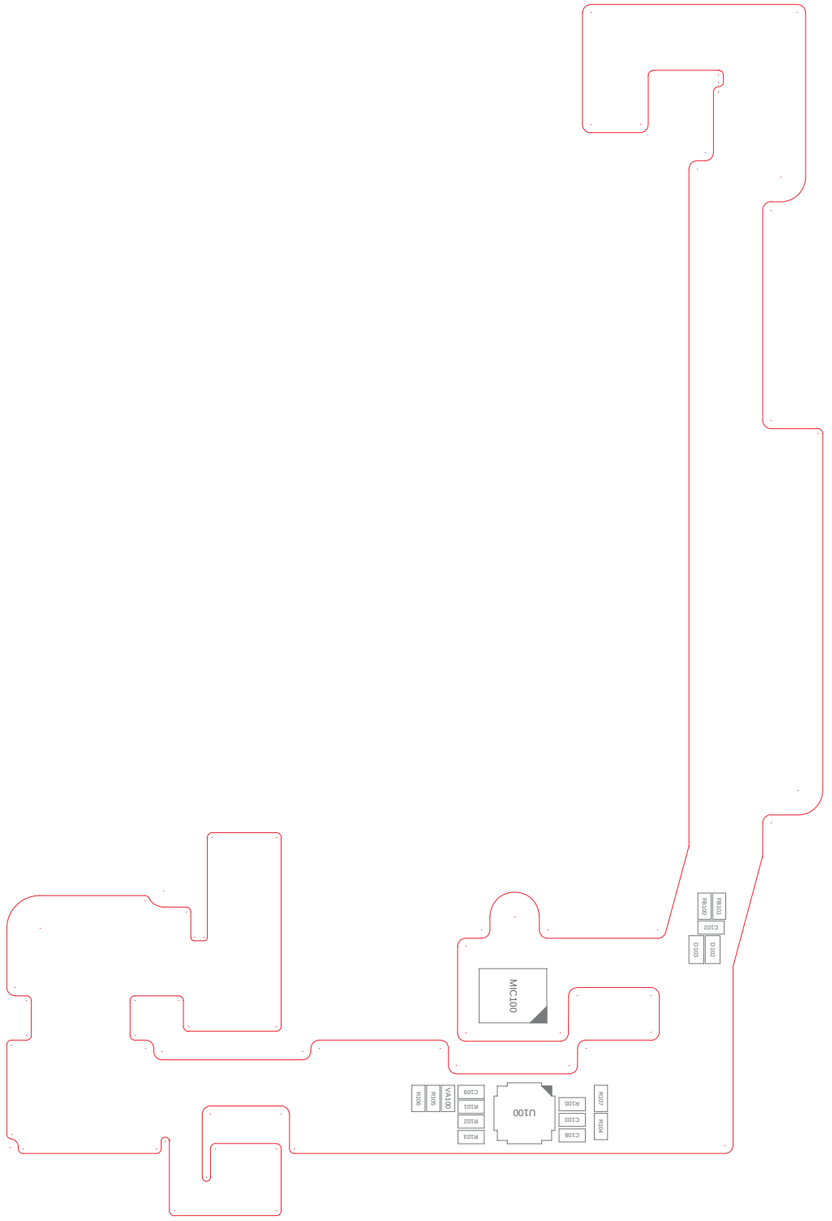
LG-E730_F_EAR_EAX64287901_1.0_TOP



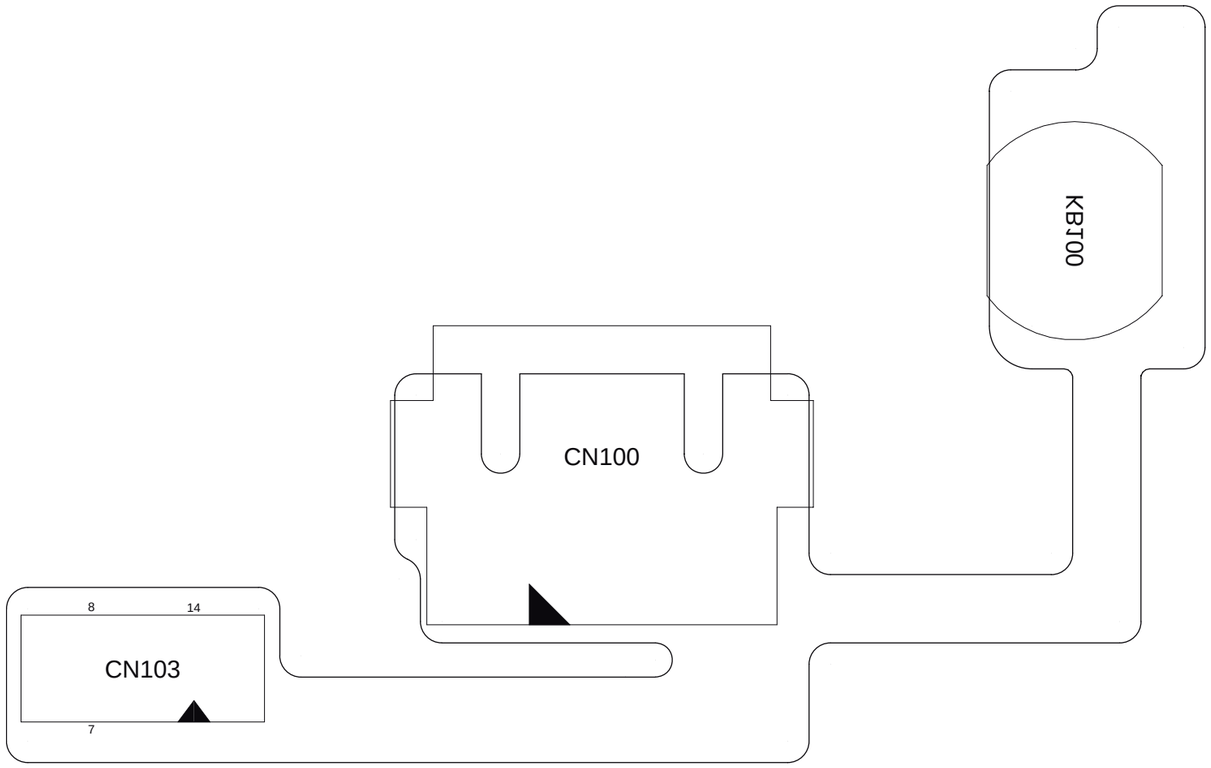
LG-E730_F_EAR_EAX64287901_1.0_BOT



LG-E730_F_TOUCH_EAX64288101_1.1_TOP



LG-E730_F_TOUCH_EAX64288101_1.1_TOP



LG-E730_F_USB_EAX64269801_1.0_TOP

10. CALIBRATION

10.1 General Description

This document describes how to install and use the RF calibration software (Tachyon) of LG 3G mobile phone with Infineon Chipsets.

10.2 Requirement

Requirements for RF calibration of LGE mobile phone are outlined in the following sections.

10.2.1 Hardware

Desktop or laptop computer

Agilent 8960 Series 10 (E5515C) Testset

GPIB card and cable for communicating with Agilent 8960 Series 10 Testset

Power Supply, or 4V battery, and power cable for putting power on the mobile phone.

Data(USB or UART) cables for connecting the mobile phone to computer's serial port

RF cable

10.2.2 driver

National Instruments GPIB & VISA driver

LGE mobile USB driver

Data cable driver(optional)

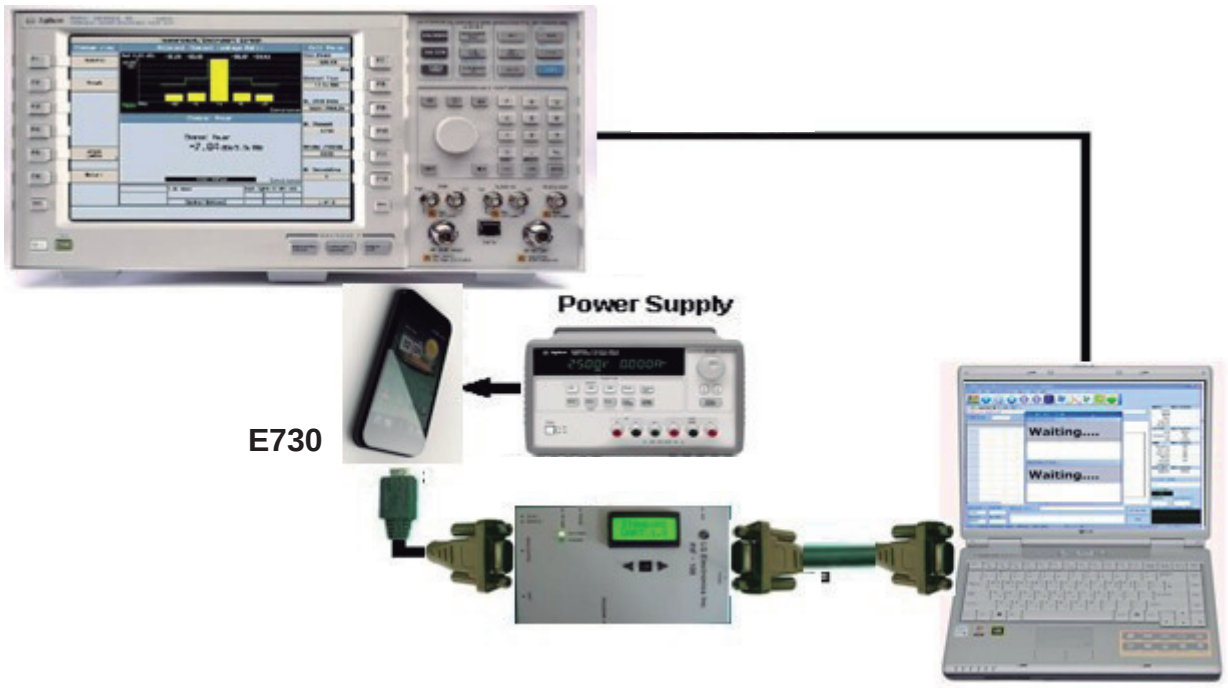
10.2.3 System

Windows XP SP2 or better

RAM 512M or grater

HDD 1GB of available space

10.3 Setup for RF calibration



10.4 Tachyon Software Installation

1) Install Tachyon_setup_Eng_xxxxxxxx.exe to C:/LGE/Tachyon directory.

2) Unzip Tachyon_Release_xxxxxxxx.zip, and overwrite all files to the same path.

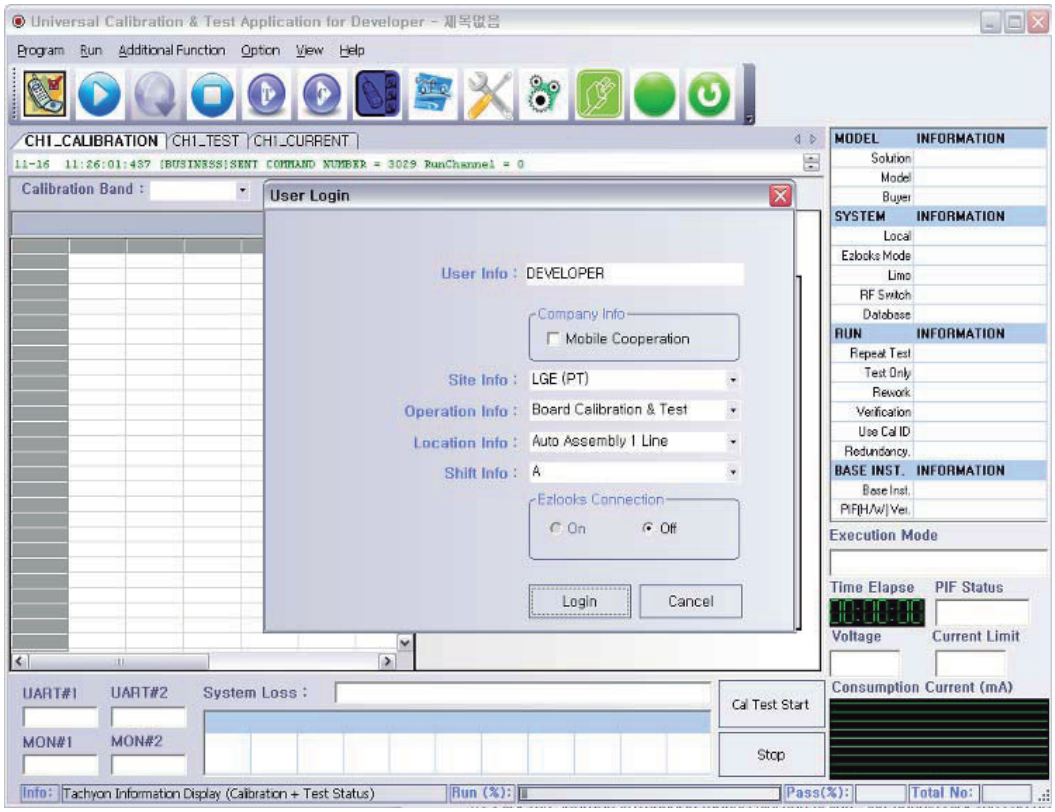
3) Install OCX_Registration.bat for registering Tachyon Components in C:/LGE/Tachyon/OCX/ directory.

10.5 Tachyon Usage

After hardware setup is completed successfully and Tachyon program is installed ordinarily, RF calibration or Auto Test can be start in the following procedure.

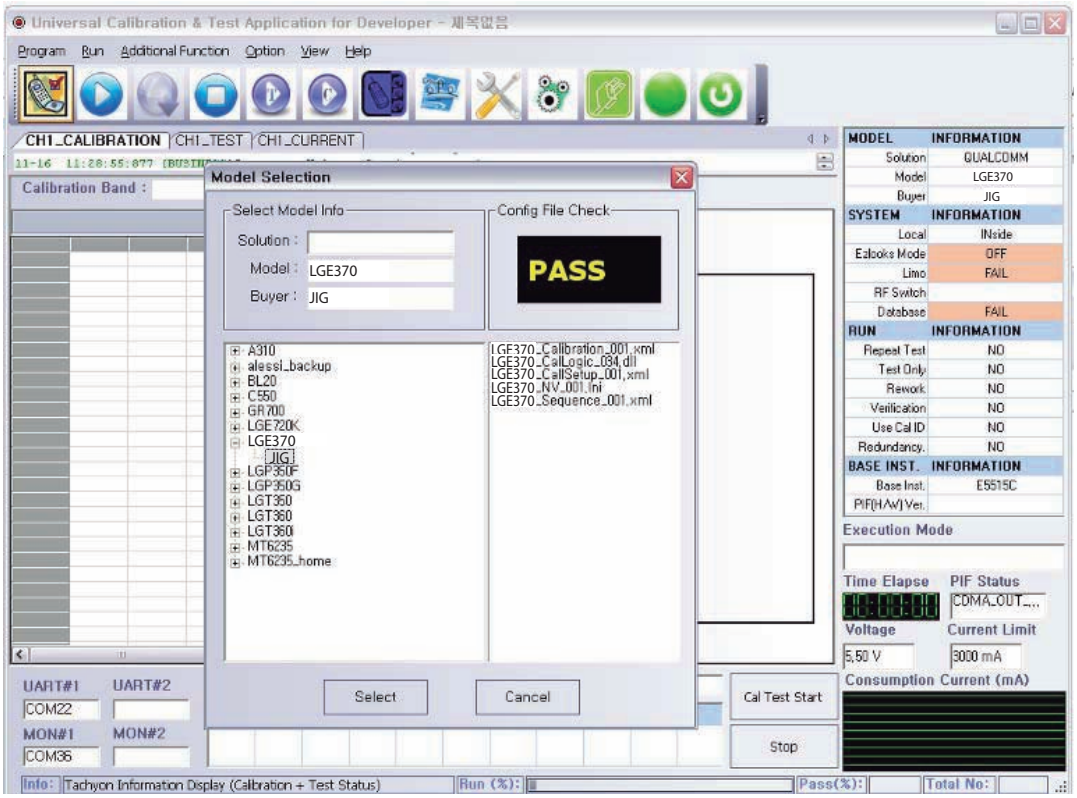
1)Execute Tachyon.exe in C:/LGE/Tachyon directory.

2)Click login button in the following login dialog window.

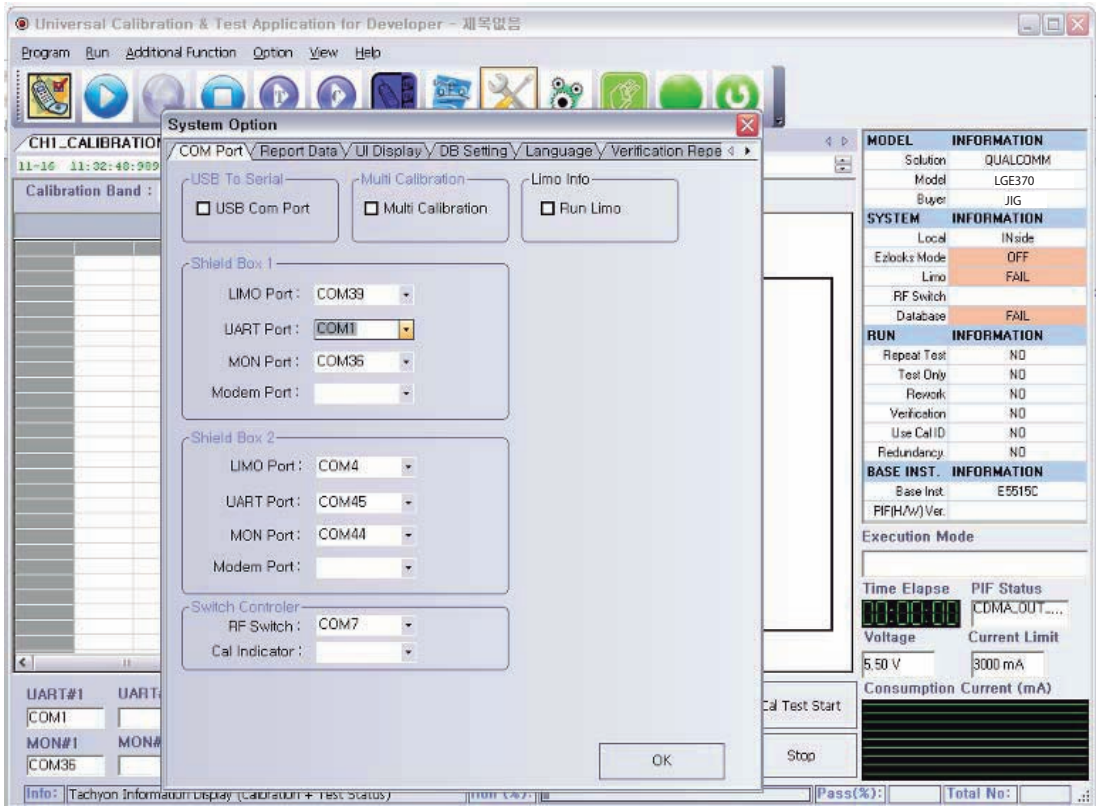


3)Click “model selection” button in toolbar for selecting the appropriate model.

4)Double click the right model – LGE730/JIG - in model tree, and then click ”select” button.

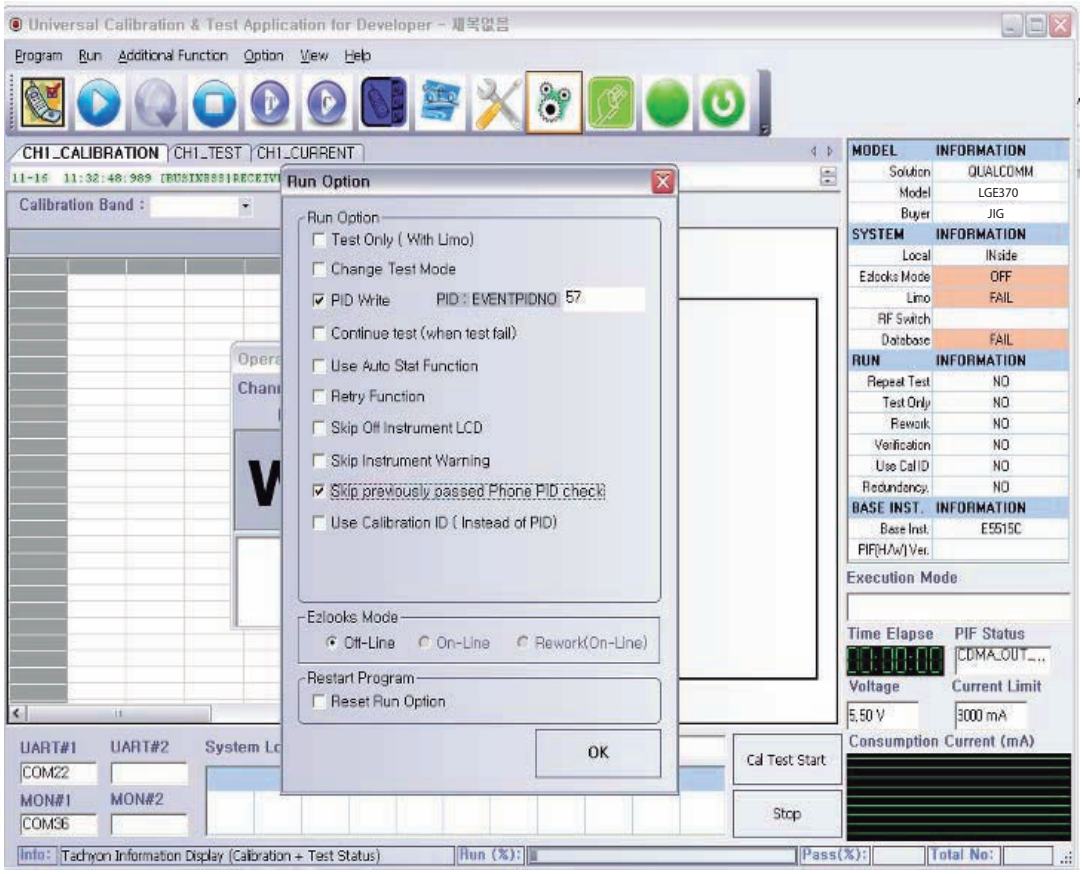


5)Click “system option” button in toolbar to connect the mobile phone to the Tachyon.



6)Click “run option” button in toolbar for passing over LGE factory setting.

7)Check “PID write” and “Skip previously Phone PID check”



8)Execute Hecaton.exe for setting RF cable loss to Agilent 8960. If not, Tachyon can't run.

9)Click "Calibration+Auto Test" button in Toolbar. Now RF calibration and autotest will start.

For more information, refer to the manual in C:/LGE/Tachyon/Manual folder.

10.6 Overview of RF Calibration

10.6.1 Supported entry of RF Calibration

As using QTR8200, E730 adopts some of calibrations in those of QTR8200. This is also supporting Quad band WCDMA and Quad band GSM. Table 10.6.1 and Table 10.6.2 describes the information listed for RF calibration items used by E730.

Calibration	WCDMA 2100	WCDMA 1900	WCDMA 900	WCDMA 850	description
Tx Sweep Calibration	○	○	○	○	Tx output power measurements
Tx Hdet Calibration	○	○	○	○	HDET ADC measurements vs Tx power
Tx Comp vs Freq Calibration	○	○	○	○	16-channel Tx output measurements in a certain PDM
Tx Secondary Comp vs Freq Calibration	X	X	X	X	Irregular Tx power measurements in a certain PDM
Tx Lim vs Freq Calibration	○	○	○	○	HDET ADC measurements in the Target Power
Rx DVGA Gain Offset Calibration	○	○	○	○	Rx DVGA gain measurements
Rx DVGA Gain Offset vs Freq Calibration	○	○	○	○	16-channel RX DVGA gain measurements
Rx LNA Range Offset Calibration	○	○	○	○	LNA gain offset measurements
Rx LNA Range Offset vs Freq Calibration	○	○	○	○	16-channel LNA gain offset measurements

Table 10.6.1. The calibration list for WCDMA

Calibration	GSM900	GSM850	GSM1800	GSM1900	description
VCO Calibration	○	X	X	X	Lowest frequency error- VCO measurement
Thermistor Calibration	○				Thermistor max/min ADC measurement regardless of band
Tx External Polar Calibration	○	○	○	○	Tx output power measurements
Polar path delay Calibration	X	X	X	X	PM and AM signal path delay
Carrier Suppression Calibration	X	X	X	X	carrier power measurement
Rx Gain Range Calibration	○	○	○	○	8 or 16 channel Rx Gain measurements

For more information, refer to “80-VP447-13_RF_NV_ITEMS.pdf”.

Table 10.6.2 The calibration list for GSM

10.6.2 Feature of RF calibration

Tachyon configuration is describes in this section. The information indicates the state of the mobile phones will become a factor.

[1] WCDMA band

Table 10.6.3 describes the calibration feature of WCDMA band.

Item		Sub Item	WCDMA 2100	WCDMA 900
Calibration Channel		Tx	9750	2788
		Rx	10700	3013
Tx Target Power(dBm)			23.0	23.0
PAM gain switching(dBm)		High to low gain	11.0	11.0
		Low to high gain	14.0	14.0
High Gain Mode	Calibrated PDM Range	Max	222	227
		Min	160	134
	PDM step		2	3
	Measured data of 32 array		26	25
	Threshold of Power Range(dBm)	≥ Up threshold	25.0	25.0
		≤ Low threshold	6.0	6.0
Low Gain Mode	Calibrated PDM Range	Max	235	255
		Min	80	69
	PDM step		5	6
	Measured data of 32 array		27	26
	Threshold of Power Range(dBm)	≥ Up threshold	15.0	16.0
		≤ Low threshold	-55.0	-53.0
Allowable power range in HDET range(dBm)		≥ Lower limit	16.5	16.5
		≤ Upper limit	24.5	24.5
Allowable HDET adc range		≥ Lower limit	50	80
		≤ Upper limit	160	175
DVGA Calibration Power(dBm)			-74.0	-74.0
DVGA Calibration Range		≥ Lower limit	130	80
		≤ Upper limit	300	300
LNA Calibration Power(dBm)		Range 0-1	-66.0	-68.0
		Range 1-2	-42.0	-50.0
		Range 2-3	-26.0	-38.0
		Range 3-4	X	-26.0

Table 10.6.3. Feature of Tx/Rx calibration in WCDMA 2100/900 band

[2] Quad GSM band

Table 10.6.4 describes the calibration feature of Quad GSM bands.

Item	Sub item	GSM 900	GSM 850	GSM 1800	GSM 1900
Tx Calibration channel	F1	975	128	512	512
	F2	124	251	885	810
Power range in AMAM/AMPM NVs (dBm)	Max	34.0	34.0	31.0	31.0
	Min	-20.0	-20.0	-20.0	-20.0
Rx Gain Range Calibration Power (dBm)	Range 0	-80	-80	-80	-80
	Range 1	-80	-80	-80	-80
	Range 2	-50	-50	-50	-50
	Range 3	-50	-50	-50	-50
	Range 4	-50	-50	-50	-50
Rx Gain Range Calibration Range (Lower limit/Upper limit)	Range 0	1900/2500	1900/2500	1900/2500	1900/2500
	Range 1	1200/2300	1200/2300	1200/2300	1200/2300
	Range 2	1300/1900	1300/1900	1300/1900	1300/1900
	Range 3	1200/1800	1200/1800	1200/1800	1200/1800
	Range 4	1100/1700	1100/1700	1100/1700	1100/1700
Tx External Polar calibration PDM table	13025,1900,1950,2000,2050,2100,2150,2200,2250,2300,2350,2400,2450,2500,2550,2600,2650,2700,2750,2800,2850,2900,2950,3000,3075,3150,3225,3300,3375,3450,3525,3600,3675,3750,3825,3900,3975,4050,4125,4200,4275,4350,4425,4500,4575,4650,4725,4800,4875,4950,5025,5100,5175,5250,5325,5400,5475,5550,5625,5700,5775,5850,5925,6025,6125,6225,6325,6425,6525,6625,6725,6825,6925,7025,7125,7225,7325,7425,7525,7625,7725,7825,7925,8025,8125,8225,8325,8425,8525,8625,8725,8825,8925,9025,9125,9225,9325,9425,9525,9625,9725,9825,9925,10025,10125,10225,10325,10425,10525,10625,10725,10825,10925,11025,11125,11225,11375,11525,11675,11825,11975,12125,12275,12425,12575,12725,12875,13025,13175,13325,13475,13625,13775,13925,14075,14225,14375,14525,14675,14825,14975,15125,15275,15425,15575,15725,15875,16025,16175,16300				

Table 10.6.4. Feature of Tx/Rx calibration in Quad GSM band

[3] Channels of RF Calibration

W2100 Tx	9621	9638	9656	9673	9691	9708	9726	9743	9761	9778	9796	9813	9831	9848	9866	9883
W2100 Rx	10571	10588	10606	10623	10641	10658	10676	10693	10711	10728	10746	10763	10781	10798	10816	10833
W900 Tx	2712	2722	2733	2743	2754	2765	2776	2787	2796	2806	2815	2825	2834	2844	2853	2863
W900 Rx	2937	2947	2958	2968	2979	2990	3001	3012	3021	3031	3040	3050	3059	3069	3078	3088

Table 10.6.5 Channel of WCDMA

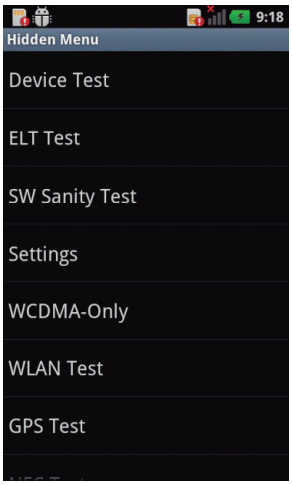
GSM850	128	145	163	180	198	215	233	251
GSM900	1	31	62	92	124	975	1000	1023

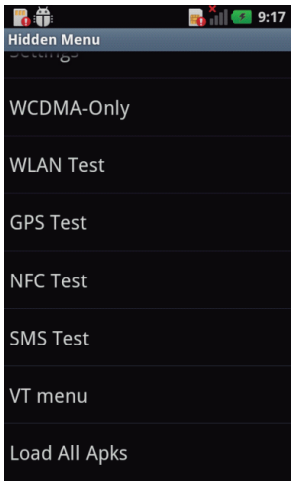
Table 10.6.6. Channel of GSM850/GSM900

GSM 1800	512	537	562	587	612	637	662	687	712	737	762	787	812	837	862	885
GSM 1900	512	532	552	572	592	612	632	652	672	692	712	732	752	772	792	810

Table 10.6.7. Channel of GSM/1800/GSM1900

11. HIDDEN MENU





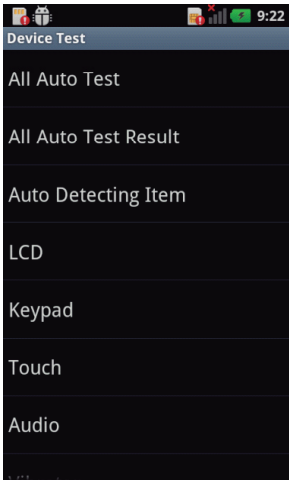
Hidden Menu Start

Start shortcut keys : 3845#*730#

Hidden Menu List

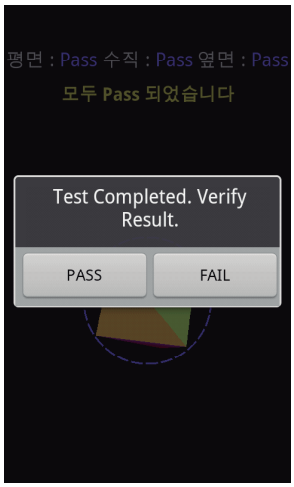
Start the desired menu: Menu, click

Device Test Menu

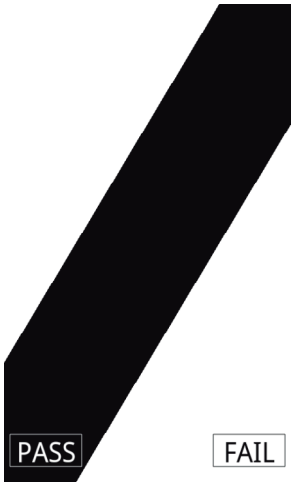


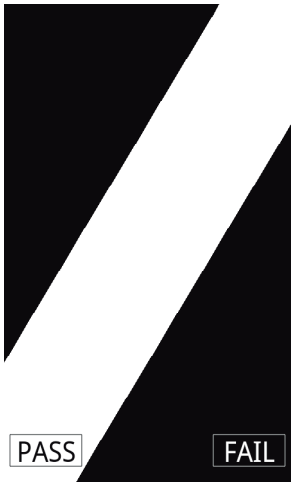
Device Test

List:
Auto all Test: Device functionality testing at the factory to use [AutoMode]
Auto All Test Result [Common]
Auto Detecting Item [Common]
[The rest is Device Indiviual Menu]
LCD
KeyPad
Touch
Audio
Vibrator
Camera
Sensors
Gps [Common]
Sound Loopback Test [Common]
External Memory
RTC
Battery
ETC

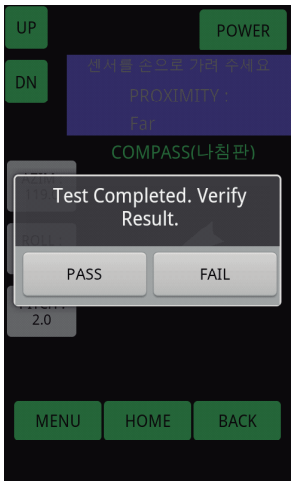


All Auto Test
Motion Sensor Test

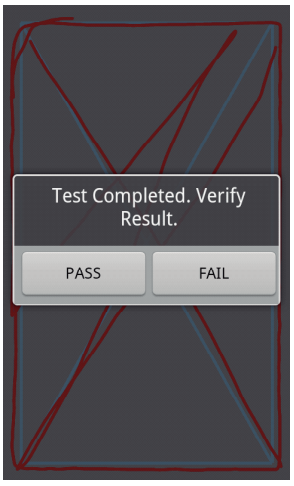




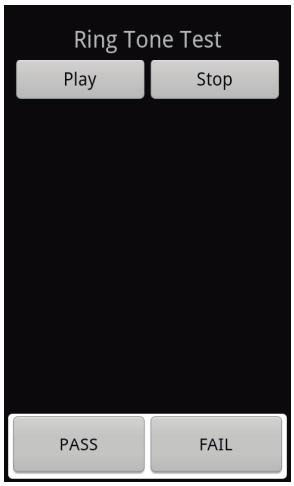
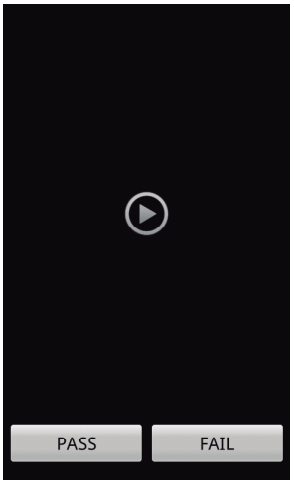
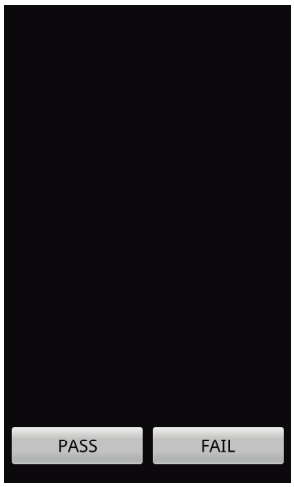
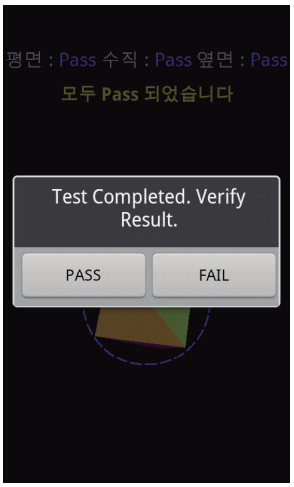
All Auto Test
LCD Display Test



All Auto Test
KeyPad Test - DOP



All Auto Test
Finger Paint Test

	**All Auto Test** Ring Tone Test		**All Auto Test** Vibrator Test – On/Off
	**All Auto Test** Camera Test – SnapShot		**All Auto Test** Camera Test – Camcording
	**All Auto Test** Camera Test – Front		**All Auto Test** Motion Sensor Test

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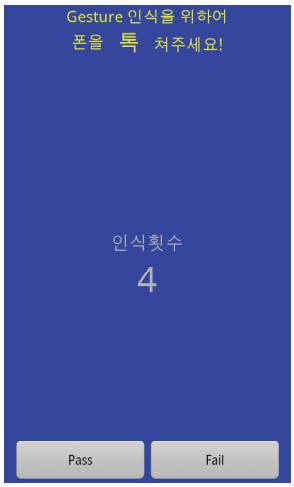
<td> 
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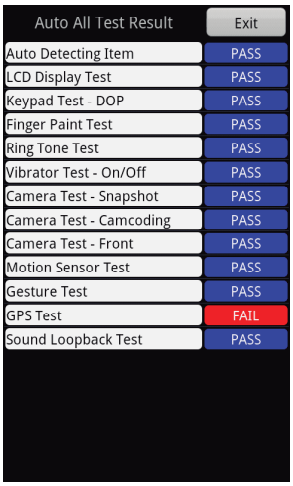
<td>All Auto Test
Gesture Test</td>
<td> 
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<td>Auto All Test Result</td>
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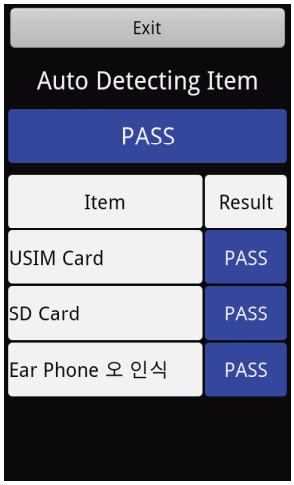
<td> 
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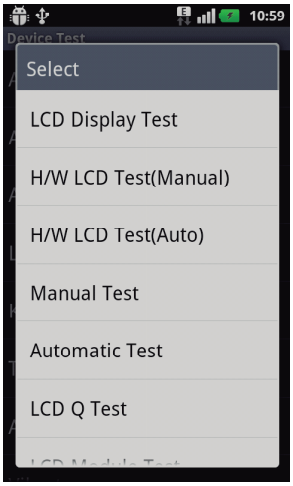
<td> 
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<td>LCD
Device Individual
Menu</td>
</tr>
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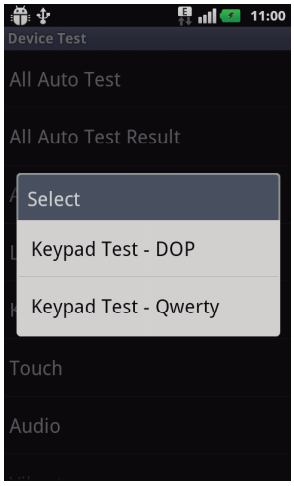
<td> 
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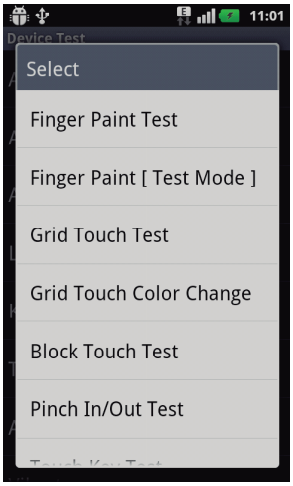
<td>Keypad
Device Individual
Menu</td>
<td> 
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<td>Touch
Device Individual
Menu</td>
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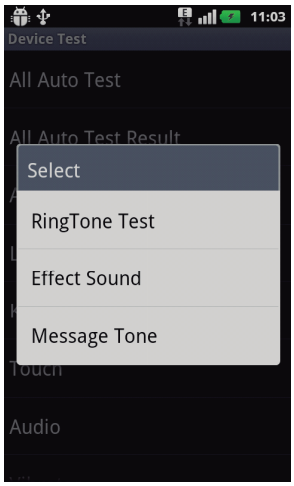
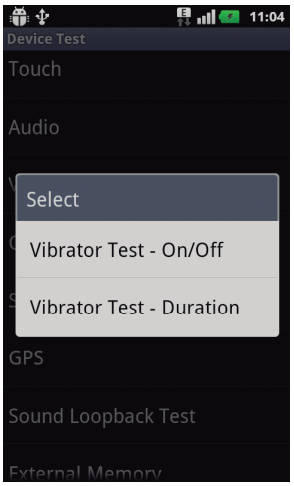
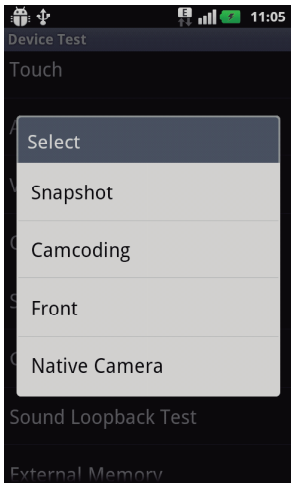
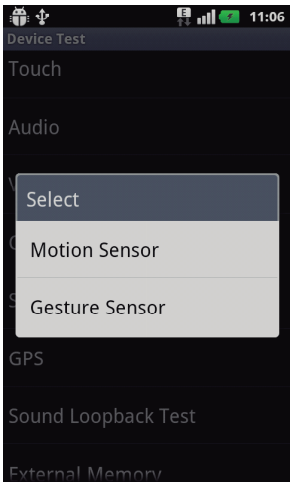
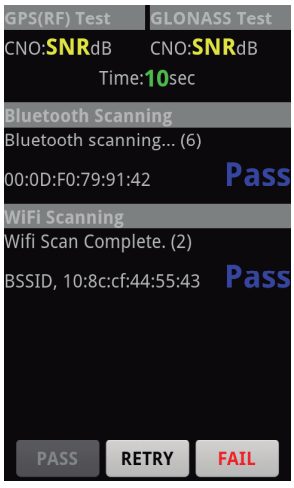
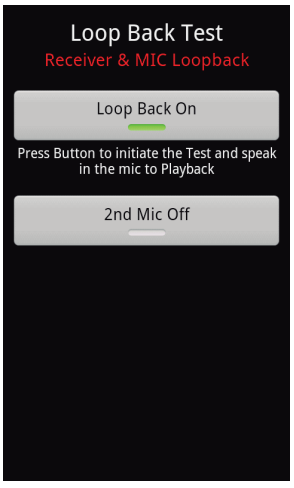
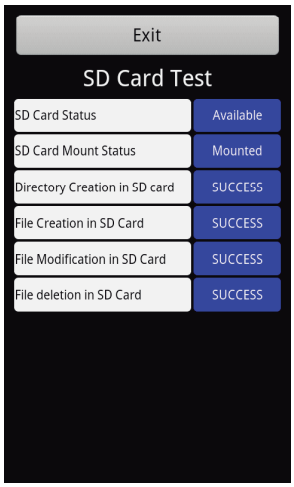
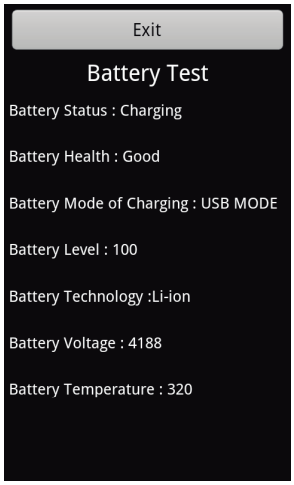
	**Audio** Device Individual Menu		**Vibrator** Device Individual Menu
	**Camera** Device Individual Menu		**Sensors** Device Individual Menu
	**GPS**		**Sound Loopback Test**

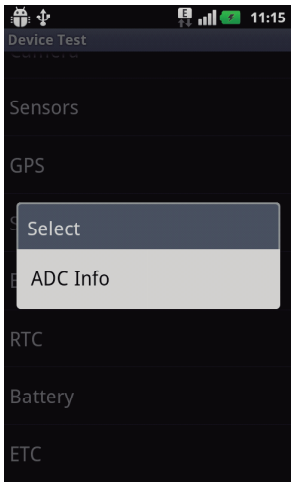


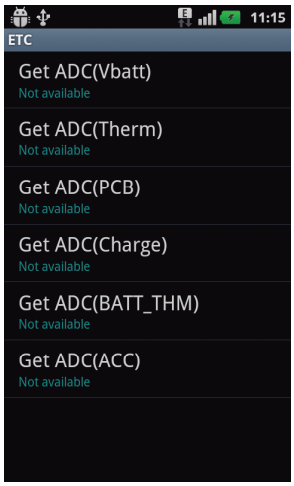
External Memory

RTC



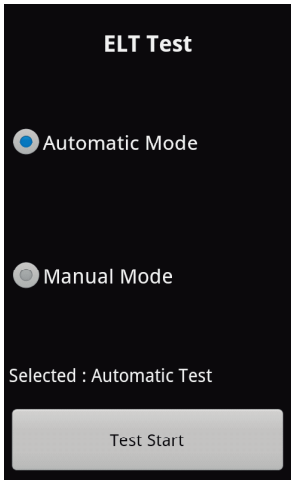
Battery



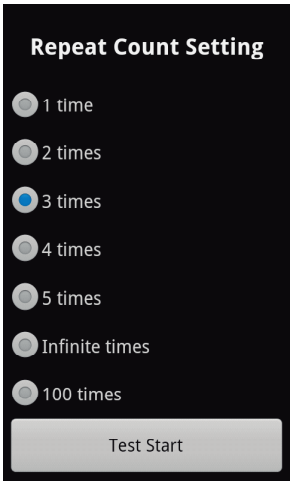


ETC

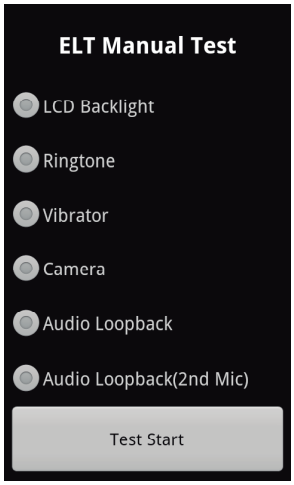
ELT Test Menu



ELT Test
Automatic Mode:
Test Automatically
Manual Mode :
Te st selectivity

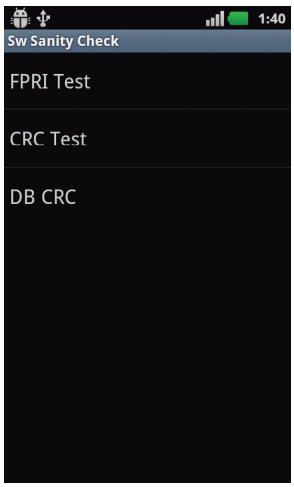


ELT Test
Automatic Mode :
LCD Automatic on/off test
-> time setting

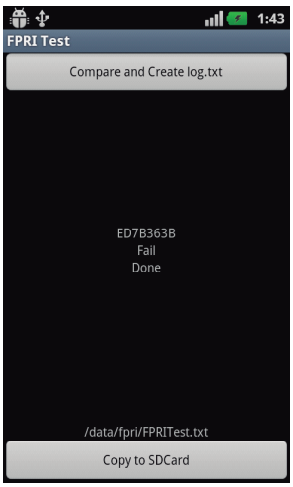


ELT Manual Test
LCD Backlight
Ringtone
Vibrator
Camera
Audio Loopback
-> test on the device is working (The ability to use plant)
Audio Loopback
(2nd Mic)

SW Sanity Test



SW Sanity Test
FPRI Test
CRC Test
DB CRC



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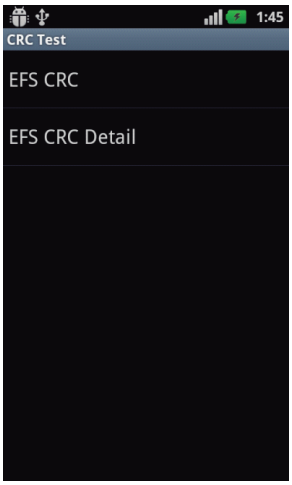
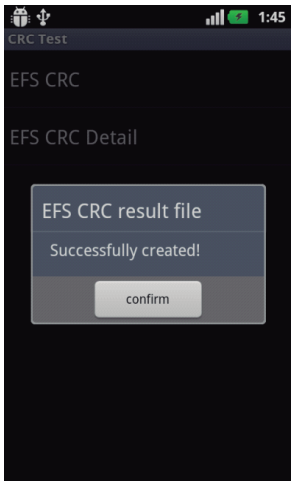
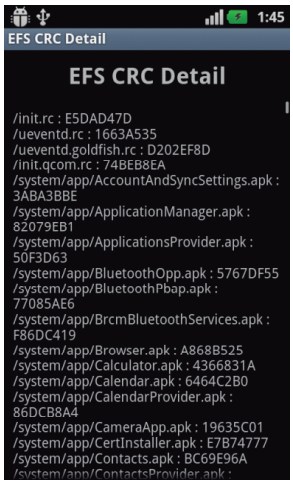
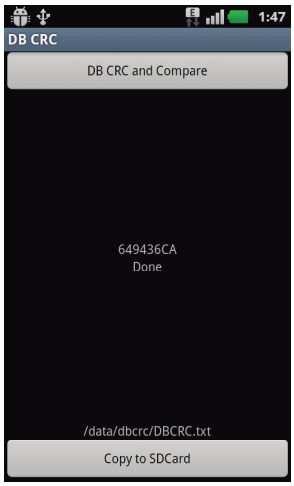




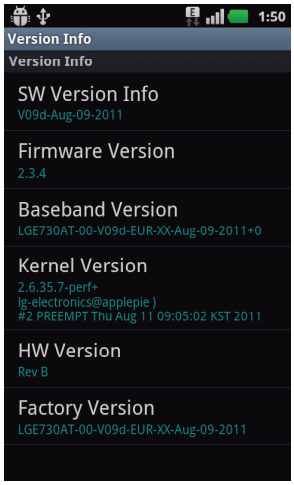


CRC Test

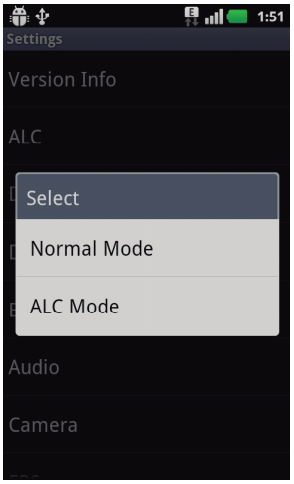


DB CRC

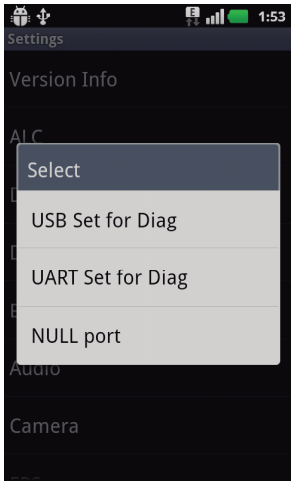
Settings Menu



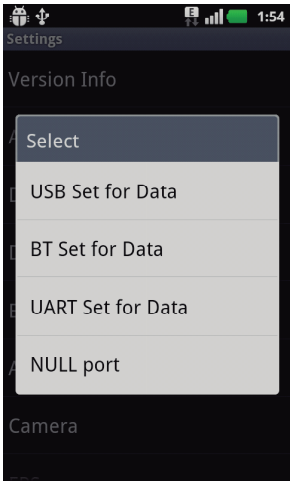
Version Info
Classified Information representation



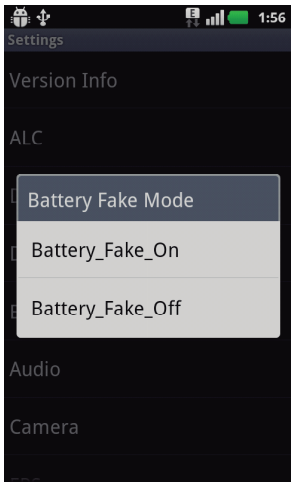
ALC



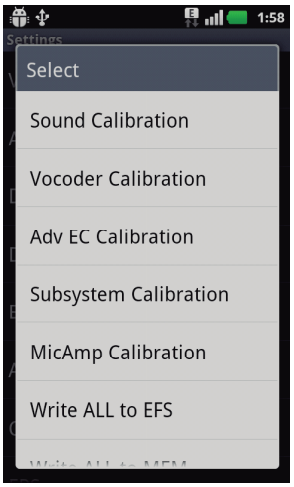
Diag Settings



Data Settings



Battery



Audio

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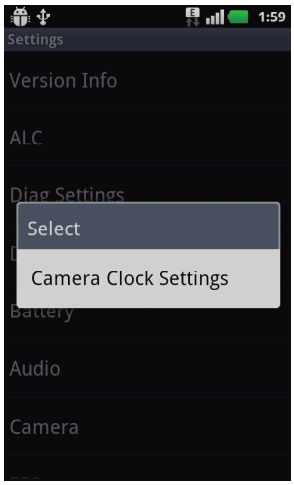
<td> 
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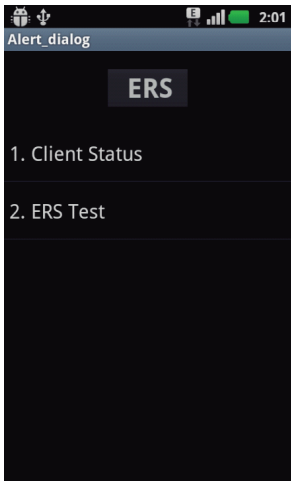
<td> 
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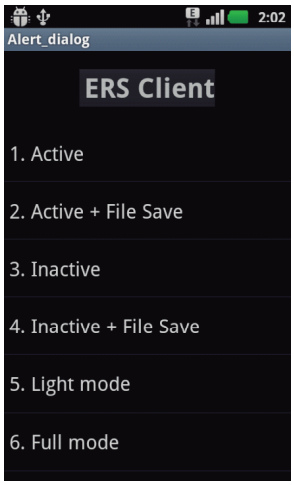
<td> 
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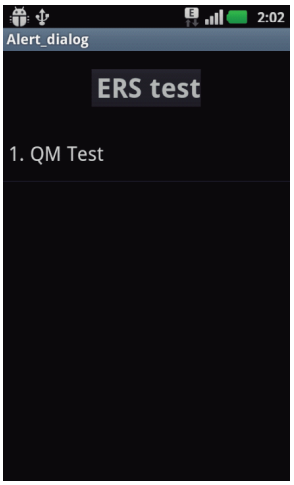
<td> 
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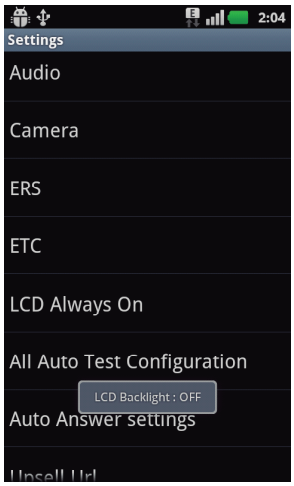
<td> 
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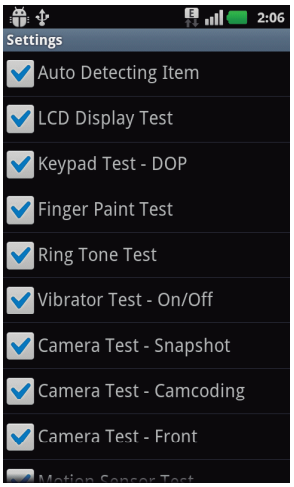
<td> 
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This List is Matching AllAutoTest Result List</td>
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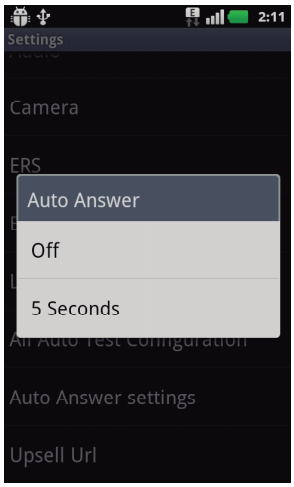
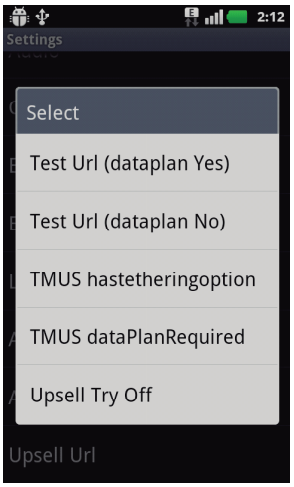
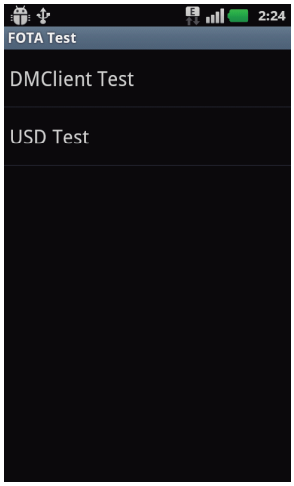


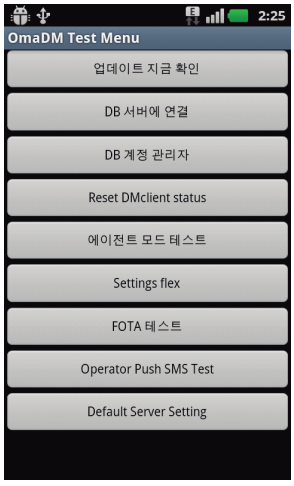
Auto Answer Settings



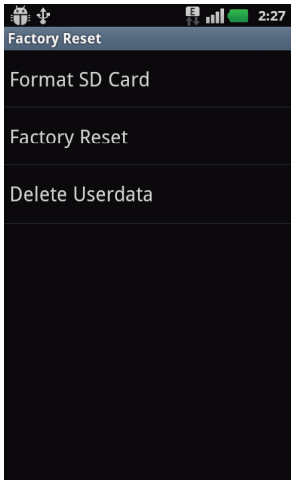
Upsell Url

WCDMA-Only Menu

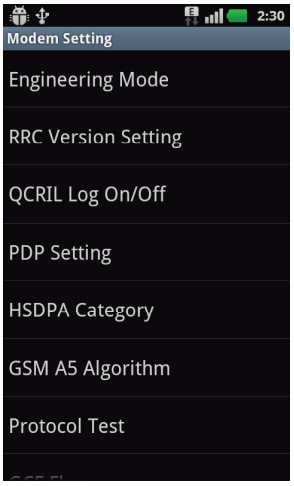




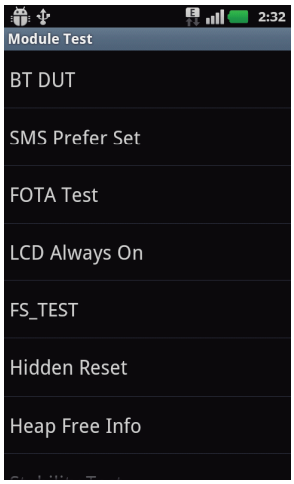
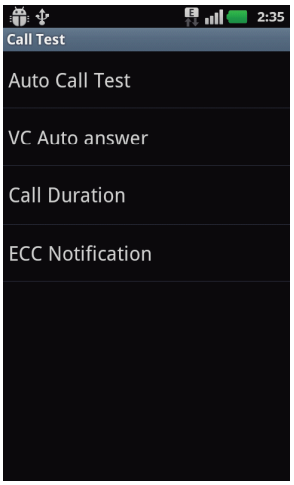
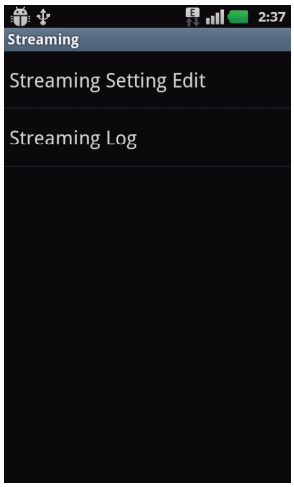
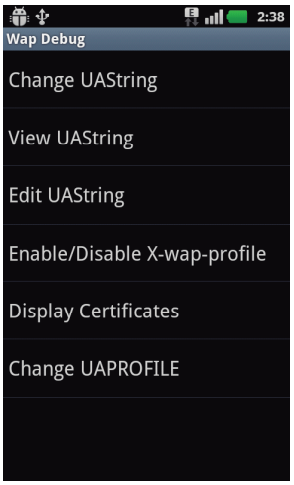
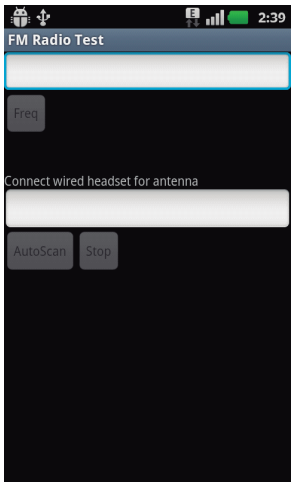
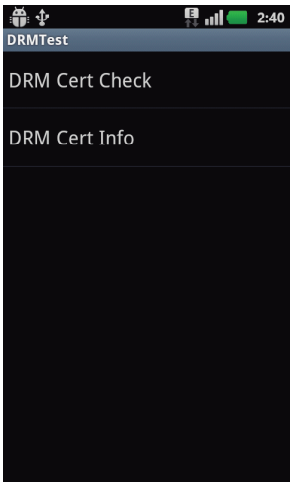
DM/FOTA Test

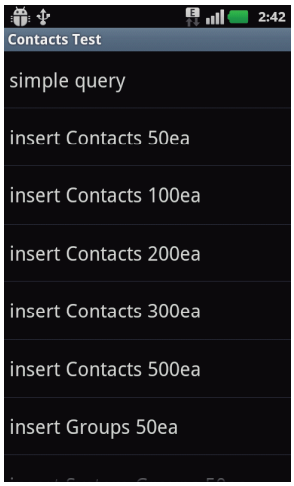


Factory Reset

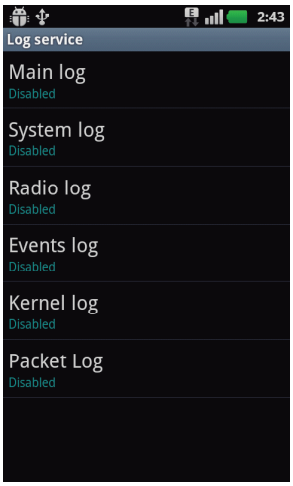


Modem Setting
[Sub Menu exist]

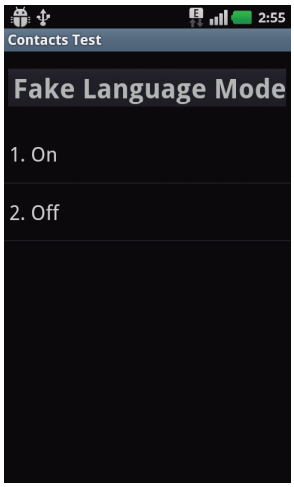
	**Modem Setting** [Sub Menu exist]		**Call Test**
	**Streaming**		**WAP Debug** [Sub Menu exist]
	**FM Radio Test**		**DRM Test**



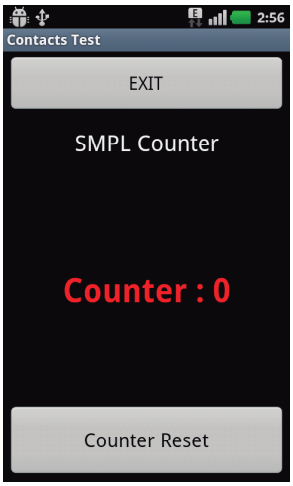
Contact Test



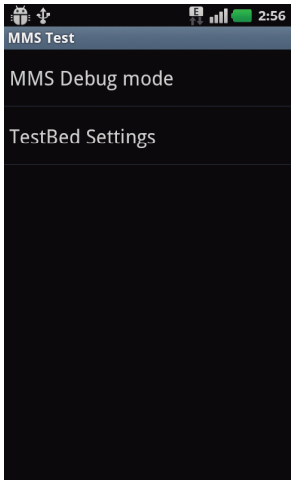
Log Service



Fake Language

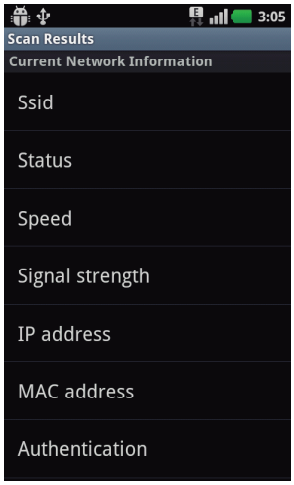
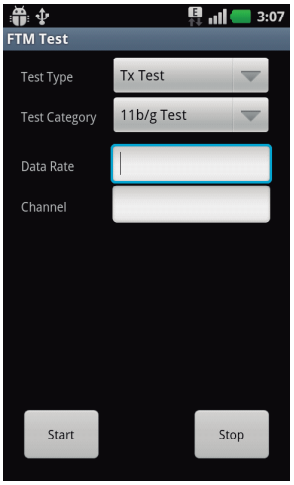
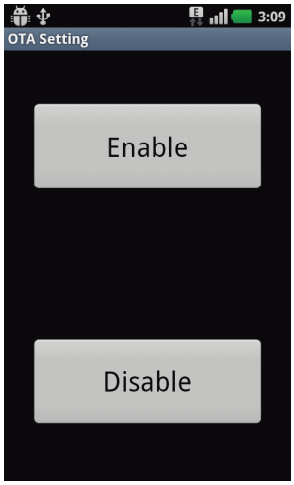
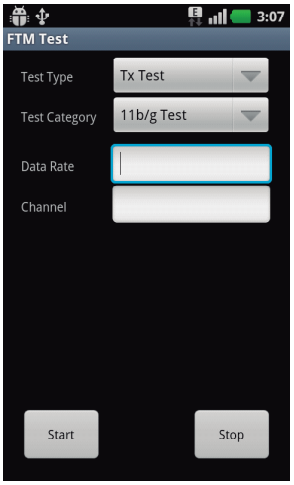


SMPL Counter

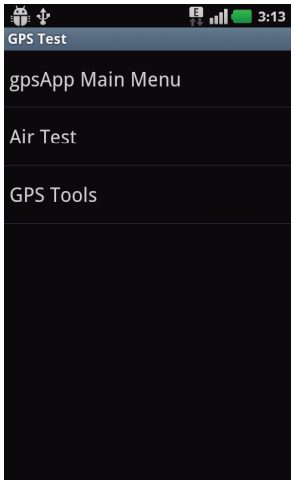
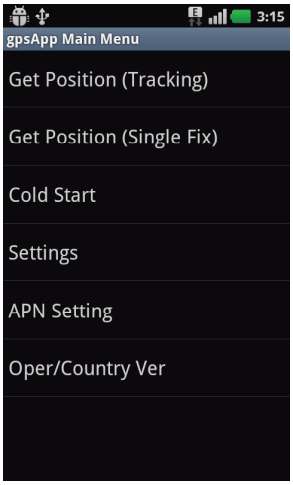
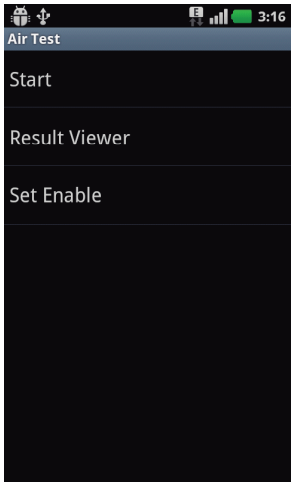
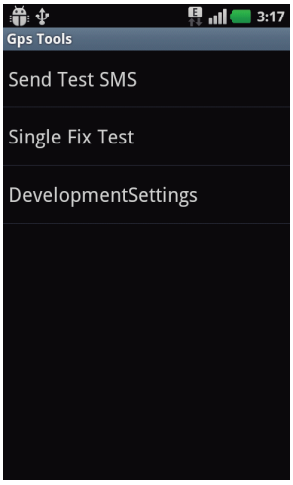


MMS Test

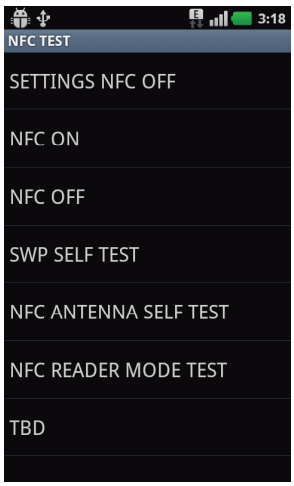
WLAN Service Menu

	**Net Info –** **Scan Result** [Sub Menu exist]		**FTM Test**
	**OTA Setting**		**One WayTest**

GPS Test Menu

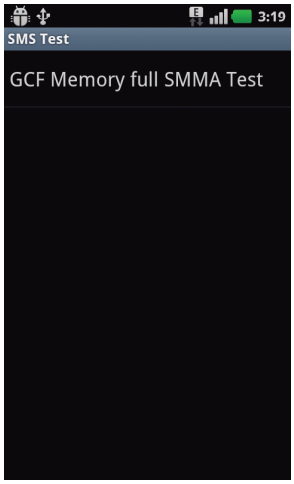
	**Gps Test Menu**		**gpsApp Main Menu**
	**Air Test**		**Gps Tools**

NFC Test Menu



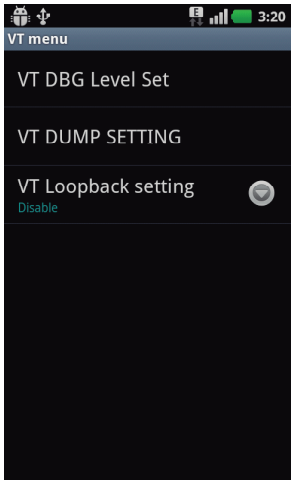
NFC Test Menu

SMS Test Menu



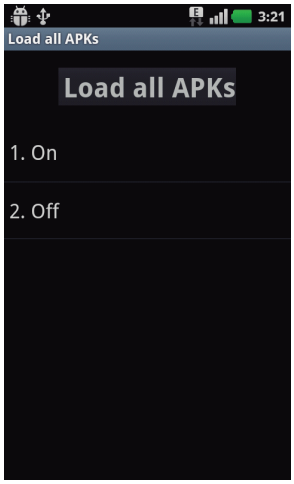
SMS Test Menu

VT Test Menu



VT Test Menu

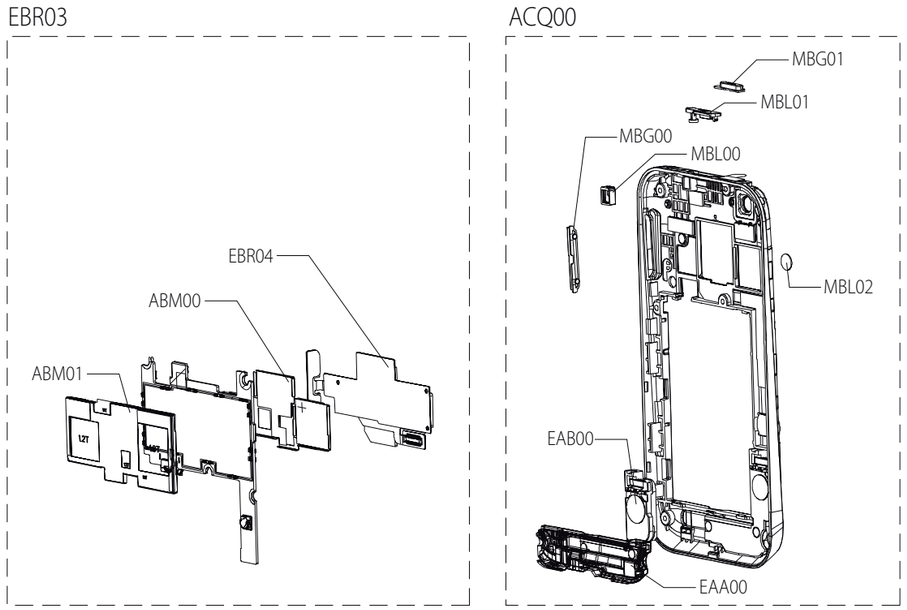
Load All Apks Menu

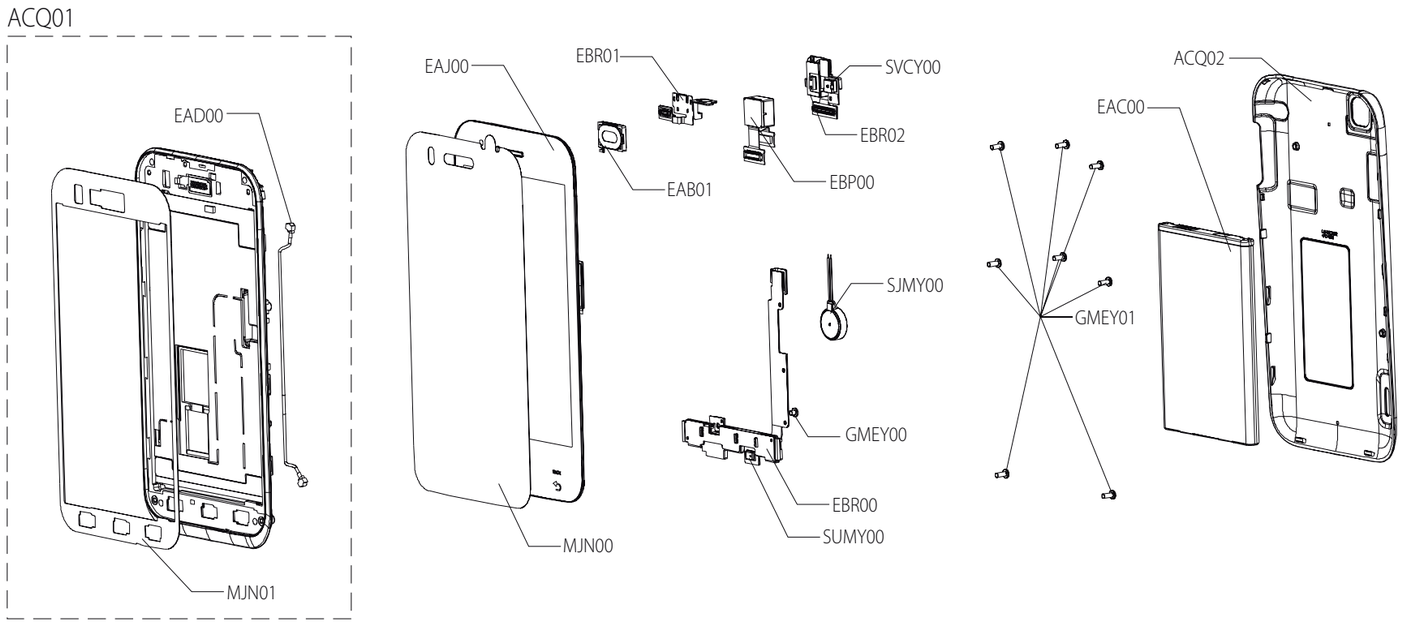


Load All Apks Menu

12. EXPLODED VIEW & REPLACEMENT PART LIST

12.1 EXPLODED VIEW





Location	Description
ACQ00	Cover Assembly,Rear
MBL00	Cap
MBL01	Cap,Receptacle
MBL02	Cap
MBG00	Button
MBG01	Button,Side
EAA00	PIFA Antenna,Multiple
EAB00	Speaker Module
GMEY00	Screw,Machine
SJMY00	Motor,DC
EBR00	PCB Assembly,Flexible
EBR01	PCB Assembly,Flexible
EBR02	PCB Assembly,Flexible
SVCY00	Camera Module
SUMY00	Microphone,Condenser
EBP00	Camera Module
EAJ00	LCD Module
EAB01	Receiver
MJN00	Tape,Window
ACQ01	Cover Assembly,Front
MJN01	Tape,Window
EAD00	Cable,Assembly
EBP00	Camera Module
GMEY01	Screw,Machine
EBR03	PCB Assembly,Main
ABM00	Can Assembly,Shield
EBR04	PCB Assembly,Flexible
ABM01	Can Assembly,Shield
ACQ02	Cover Assembly,Battery
EAC00	Rechargeable Battery,Lithium Ion

12.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
1	AGQ000000	Phone Assembly	AGQ86730301	LGE730.AVDSBK BK:Black -	
2	MEZ002100	Label, Approval	MLAA0062316	COMPLEX GU280 OREBK ZZ:Without Color COMPLEX, (empty), , , , ,	
2	ACQ100400	Cover Assembly, EMS	ACQ85600014	LGE730.AVDSBK BK:Black -	
3	ACQ00	Cover Assembly, Rear	ACQ85618201	LGE730.AVD2BK BK:Black -	
4	MJN089300	Tape, Window	MJN67893201	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MDS000000	Gasket	MDS63835301	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ015704	Damper, Connector	MCQ66712301	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ015702	Damper, Connector	MCQ66712101	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ015701	Damper, Connector	MCQ66712001	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ049800	Damper, Motor	MCQ66692301	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ015703	Damper, Connector	MCQ66692101	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ000000	Damper	MCQ66692001	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCQ009400	Damper, Camera	MCQ66691901	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MCK063300	Cover, Rear	MCK66812701	MOLD PC LGE730.AVD2BK BK:Black PC	
4	MBL00	Cap	MBL65038301	MOLD RUBBER LGE730.AORUTN ZZ:Without Color CAP, RUBBER	
4	MBL01	Cap, Receptacle	MBL65038201	MOLD PC LGE730.AORUTN TN:TITANIUM PC+RUBBER	
4	MBL02	Cap	MBL65022101	COMPLEX LGE730.AORUTN ZZ:Without Color CAP, RF	

Level	Location No.	Description	PartNumber	Spec	Remark
4	MBG00	Button	MBG64343701	MOLD PC LGE730.AORUTN TN:TITANIUM PC+RUBBER	
4	MBG01	Button, Side	MBG64343601	MOLD PC LGE730.AORUTN TN:TITANIUM PC+RUBBER	
4	MCE000000	Contact	MCE62253001	COMPLEX LG-P990 ZZ:Without Color P990_PIN_DPA	
4	EAA00	PIFA Antenna, Multiple	EAA62608101	AKB-00004 DUAL -2DB 5 Planar Inverted F Type DPA MOBITECH CORPORATION	
4	EAB00	Speaker Module	EAB62488501	1810-8T-13MP Nd-Fe-B 700mW 8OHM 86DB 1.05KHZ 55.25 X 35.46 X 5.25 PIN KIRYN TELECOM CO., LTD	
4	MJN061101	Tape, Protect	MJN68000001	COMPLEX LGE730.AORUTN ZZ:Without Color Protection button Volume	
4	MJN061100	Tape, Protect	MJN67999901	COMPLEX LGE730.AORUTN ZZ:Without Color Protection Button Power	
4	MJN000000	Tape	MJN67893501	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MKC009400	Window, Camera	MKC64100601	CUTTING GLASS LGE730.AORUTN ZZ:Without Color GLASS 0.8T	
4	MCR000000	Decor	MCR64527801	COMPLEX LGE730.AORUTN ZZ:Without Color ALUMINIUM	
3	ACQ003400	Cover Assembly, Bar	ACQ85625202	LGE730.AVD2BK BK:Black EU OPEN USP FILM	
4	MJN089300	Tape, Window	MJN67976302	COMPLEX LGE730.AORUTN ZZ:Without Color EU OPEN	
4	MJN000000	Tape	MJN67871201	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MHK000000	Sheet	MHK63547601	COMPLEX LGE730.AORUTN ZZ:Without Color PC SHEET 1.05T	
4	MGJ000000	Plate	MGJ63084501	MOLD PC LGE730.AORUTN ZZ:Without Color TRANSPARENT POLYCARBONATE	
4	MCQ000000	Damper	MCQ66988601	COMPLEX LGE730.AVD2BK ZZ:Without Color OLED FPCB PAD	
4	MCQ009400	Damper, Camera	MCQ66691801	COMPLEX LGE730.AORUTN ZZ:Without Color PAD	
4	MBL000001	Cap	MCCZ0049102	MOLD TPU LGE730.ADEUKT ZZ:Without Color MOLD, PC LUPOY SC-1004A, , , , ,	
4	MBL000000	Cap	MBL65038401	PRESS SUS 0.3T LGE730.AORUTN ZZ:Without Color SUS 0.3T	

Level	Location No.	Description	PartNumber	Spec	Remark
4	MAZ000001	Bracket	MAZ63228001	PRESS SUS 0.3T LGE730.AORUTN ZZ:Without Color SUS 0.3T	
4	MAZ000000	Bracket	MAZ63227701	MOLD PC LGE730.AORUTN ZZ:Without Color PC	
4	GMEY00	Screw, Machine	GMEY0013801	GMEY0013801 FH + 1.4mM 2mM MSWR NI PLT N - SERVEONE CO., LTD.	
4	SJMY00	Motor, DC	SJMY0007118	MVMF-A301F 2.0 V, 40 mA, 10*3.0, Q-Coin 12mm Wire, 3V, - LG INNOTEK CO., LTD	
4	EBR00	PCB Assembly, Flexible	EBR74219201	LGE730.AVD2BK 1.1 Flexible	
5	EBR070400	PCB Assembly, Flexible, SMT	EBR73691401	LGE730.AORUTN 1.1 Flexible	
6	EBR070200	PCB Assembly, Flexible, SMT Bottom	EBR74239601	LGE730.AORUTN 1.1 Flexible	
7	MIC100	Microphone, Condenser	SUMY0010609	SPU0410HR5H -PB SPU0410HR5H -PB, UNIT, 42 dB, 3.76*2.95*1.1, mems smd mic KNOWLES ACOUSTICS	
6	EBR070300	PCB Assembly, Flexible, SMT Top	EBR74219101	LGE730.AORUTN 1.1 Flexible	
7	SW100	Connector, RF	ENWY0003901	U.FL-R-SMT(10) 1.90MM STRAIGHT SOCKET SMD T/REEL CU 50OHM 300mDB HIROSE KOREA CO., LTD	
6	EAX010700	PCB, Flexible	EAX64288101	LGE730.AORUTN 1.0 POLYI SBL 4 0.33 Flexible	
4	EBR01	PCB Assembly, Flexible	EBR73691001	LGE730.AVD2BK 1.0 Flexible	
5	EBR070400	PCB Assembly, Flexible, SMT	EBR73691201	LGE730.AORUTN 1.0 Flexible	
6	EAX010700	PCB, Flexible	EAX64269801	LGE730.AORUTN E POLYI SBL 4 0.33 Flexible	
6	EBR070300	PCB Assembly, Flexible, SMT Top	EBR74239501	LGE730.AORUTN 1.0 Flexible	
6	EBR070200	PCB Assembly, Flexible, SMT Bottom	EBR74239401	LGE730.AORUTN 1.0 Flexible	
4	EBR02	PCB Assembly, Flexible	EBR73690301	LGE730.AVD2BK 1.0 Flexible	

Level	Location No.	Description	PartNumber	Spec	Remark
5	EBR070400	PCB Assembly, Flexible, SMT	EBR73690401	LGE730.AVD2BK 1.0 Flexible	
6	EAX010700	PCB, Flexible	EAX64287901	LGE730.AORUTN C POLYI SBL 4 0.33 Flexible	
6	EBR070200	PCB Assembly, Flexible, SMT Bottom	EBR74221401	LGE730.AORUTN 1.0 Flexible	
6	EBR070300	PCB Assembly, Flexible, SMT Top	EBR74221501	LGE730.AORUTN 1.0 Flexible	
7	SVCY00	Camera Module	SVCY0019901	TCM9001MD CMOS, VGA, Toshiba(1/10"), 4x4x2.23t, Reflow Type TOSHIBA	
7	SUMY00	Microphone, Condenser	SUMY0010609	SPU0410HR5H -PB SPU0410HR5H -PB, UNIT, 42 dB, 3.76*2.95*1.1, mems smd mic KNOWLES ACOUSTICS	
4	EBP00	Camera Module	EBP61481701	CW5012-AP017 CW5012-AP017 5M AF, Aptina(1/4") CIS, 8.5x8.5x5.4t, MIPI, FPCB COWELL ELECTRONICS CO., LTD	
4	EAJ00	LCD Module	EAJ61868001	LH380WV1-EO02-Q11 WVGA 3.78INCH 480X800 300CD COLOR 100% 16/9 50000 :1 - - - LG Display Co. Ltd.	
4	EAB01	Receiver	EAB62488401	BWBR1208F-08-P 30mW 32OHM 105DB 300HZTO3.5KHZ FPCB - BUJEON ELECTRONICS CO., LTD	
4	MJN00	Tape, Window	MJN68000201	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	ACQ01	Cover Assembly, Front	ACQ85599901	LGE730.AVD2BK BK:Black COVER ASSY, FRONT	
5	MCQ000000	Damper	MCQ66711801	COMPLEX LGE730.AORUTN ZZ:Without Color -	
5	MCQ043300	Damper, LCD	MCQ66805101	COMPLEX LGE730.AORUTN ZZ:Without Color 0.05T TAPE+PSR 0.5T+0.05T TAPE	
5	MCQ000003	Damper	MCQ66805201	COMPLEX LGE730.AORUTN ZZ:Without Color TR 0.6T	
5	MCQ000002	Damper	MCQ66825701	COMPLEX LGE730.AORUTN ZZ:Without Color TR 0.6T	
5	MDJ000000	Filter	MDJ63225601	COMPLEX LGE730.AORUTN ZZ:Without Color -	
5	MHK000000	Sheet	MHK63506801	COMPLEX LGE730.AORUTN ZZ:Without Color PC SHEET	
5	MJN01	Tape, Window	MJN67870601	CUTTING TAPE LGE730.AORUTN ZZ:Without Color TAPE 0.25T(TESA 62945)	

Level	Location No.	Description	PartNumber	Spec	Remark
5	MCQ000001	Damper	MCQ66692801	COMPLEX LGE730.AORUTN ZZ:Without Color -	
5	MCQ043301	Damper, LCD	MCQ66985901	COMPLEX LGE730.AVD2BK ZZ:Without Color PAD LCD BTM	
5	EAD00	Cable, Assembly	EAD61929501	UFL-2LPVHF-04N1TC-A88ACLG UFL-LP-066 UFL-LP-066 0.088M 2 WHITE none N HIROSE KOREA CO., LTD	
5	MJN009400	Tape, Camera	MJN67870701	CUTTING TAPE LGE730.AORUTN ZZ:Without Color TAPE 0.25T	
5	MJN000001	Tape	MJN68091201	COMPLEX LGE730.AVD2BK ZZ:Without Color 0.05T	
5	MEZ000900	Label, After Service	MLAB0006701	COMPLEX GS505 TMO ZZ:Without Color COMPLEX, (empty), , , , ,	
5	ADV000000	Frame Assembly	ADV74086601	LGE730.AVD2BK BK:Black OUTSERT COVER FRONT	
6	MCK032700	Cover, Front	MCK66812601	MOLD PC LGE730.AORUTN TN:TITANIUM PC+GF10%	
6	MDQ000000	Frame	MDQ63017801	CASTING MG LGE730.AORUTN ZZ:Without Color MAGNESIUM DIECASTING	
5	MJN000000	Tape	MJN67877401	COMPLEX LGE730.AORUTN ZZ:Without Color -	
4	MEZ000000	Label	MLAZ0038303	COMPLEX LG-LC3200 WA:White PRINTING, PPRI PRINTING	
3	EAN060000	Memory Card Assembly	EAN62326301	LGE730.AVD2BK	
4	EAN011400	IC, Memory Card, MICRO SD	EAN62119601	KT02GMKJESMBG5 2GBYTE 2.7VTO3.6V MICRO SD CARD 15.0x11.0x1.0MM TR 8P 2GB MicroSD Card (32nm 16Gb MLC) KINGMAX DIGITAL INC.	
3	EBP00	Camera Module	EBP61481701	CW5012-AP017 CW5012-AP017 5M AF, Aptina(1/4") CIS, 8.5x8.5x5.4t, MIPI, FPCB COWELL ELECTRONICS CO., LTD	
3	GMEY01	Screw, Machine	GMEY0009201	GMEY0009201 BH + 2.7mM 3.5mM MSWR3 FZB N N LG ELECTRONICS INC.	
3	EBR03	PCB Assembly, Main	EBR74606201	LGE730.AVDSKT 1.0 Main	
4	EBR071500	PCB Assembly, Main, Insert	EBR74440501	LGE730.AVD2BK 1.1 Main	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	

Level	Location No.	Description	PartNumber	Spec	Remark
5	ABM00	Can Assembly, Shield	ABM73616301	LGE730.AORUTN ZZ:Without Color SUS 0.15T	
6	MEV000000	Insulator	MEV63895101	COMPLEX LGE730.AORUTN ZZ:Without Color -	
6	MBK070300	Can, Shield	MBK63034001	PRESS SUS 0.15T LGE730.AORUTN ZZ:Without Color -	
6	MEV000001	Insulator	MEV63895201	COMPLEX LGE730.AORUTN ZZ:Without Color -	
5	EBR04	PCB Assembly, Flexible	EBR73690701	LGE730.AORUTN 1.1 Flexible	
6	EBR070400	PCB Assembly, Flexible, SMT	EBR73690801	LGE730.AORUTN 1.0 Flexible	
7	EBR070200	PCB Assembly, Flexible, SMT Bottom	EBR74406901	LGE730.AORUTN 1.0 Flexible	
7	EAX010700	PCB, Flexible	EAX64288001	LGE730.AORUTN 1.0 POLYI Multi 3 0.22 Flexible	
7	EBR070300	PCB Assembly, Flexible, SMT Top	EBR74407001	LGE730.AORUTN 1.0 Flexible	
6	MCQ000000	Damper	MCQ66833301	COMPLEX LGE730.AORUTN ZZ:Without Color -	
6	MCQ000001	Damper	MCQ66833401	COMPLEX LGE730.AORUTN ZZ:Without Color Gasket PAD_2	
6	MEV000000	Insulator	MEV63895301	COMPLEX LGE730.AORUTN ZZ:Without Color -	
6	MBK070300	Can, Shield	MBK63034101	PRESS STS 304 0.15T LGE730.AORUTN ZZ:Without Color -	
5	RAA050100	Resin, PC	BRAH0001301	UF2040 or 3075BHF . . NONE	
4	EBR071800	PCB Assembly, Main, SMT	EBR73691912	LGE730.AVDSKT 1.0 Main	
5	MEZ000000	Label	MLAZ0038301	COMPLEX LG-VX6000 ZZ:Without Color PID Label 4 Array PRINTING,	
5	EBR071700	PCB Assembly, Main, SMT Top	EBR73692201	LGE730.AVD2BK 1.0 Main	
6	EAX010000	PCB, Main	EAX64266401	LGE730.AORUTN 1.0 - Any Layer 10 0.8 -	

Level	Location No.	Description	PartNumber	Spec	Remark
5	EBR071600	PCB Assembly, Main, SMT Bottom	EBR73692301	LGE730.AVD2BK 1.0 Main	
1	AGF000000	Package Assembly	AGF76398203	LGE730.AVDSBK ZZ:Without Color LG-E730 VDS(S6T/VDS UB/Seal_UB, MB/800ea)	
2	AGJ000000	Pallet Assembly	AGJ73458301	LGE730.ANLDKT ZZ:Without Color S6T Type_Body+Cap+AL(1200x800)_800EA	
3	MAY010800	Box, Carton	MBEC0004404	COMPLEX LGE730.ANLDKT ZZ:Without Color S6T-STD Body(800EA/1200*800)	
3	MBL007000	Cap, Box	MCCL0002604	COMPLEX LGE730.ANLDKT ZZ:Without Color S6T-STD Cap(800EA/1200*800)	
3	MCQ000000	Damper	MCQ66486907	COMPLEX LGE730.ANLDKT ZZ:Without Color S6T-STD Dead Space Sleeve(800EA/1200*800)	
3	MGA000000	Pallet	MPCY0012403	COMPLEX KG800 FRABK DB:DARK BLUE -	
2	MAY047100	Box, Master	MBEE0061004	COMPLEX LGE730.ANLDKT ZZ:Without Color S6T_STD Master Box(10EA)	
2	MAY084000	Box, Unit	MAY65370803	COMPLEX LGE730.AVDSBK ZZ:Without Color LG-E730 ESP/VDS Unit box(S6T/Spanish)	
2	MFZ005500	Packing, Blister	MFZ63334401	MOLD PS LGE730.ADEUKT ZZ:Without Color LG-E730 PS Tray	
2	MEZ084000	Label, Unit	MLAP0001138	PRINTING LG-RD6100 RLC ZZ:Without Color GSM standard_Seal label	
2	MLAC00	Label, Barcode	MLAC0004541	PRINTING HB620 KPNBK ZZ:Without Color GSM standard_unit box label_90*40	
2	MLAJ00	Label, Master Box	MLAJ0004402	PRINTING CG300 CGR DG ZZ:Without Color LABEL MASTER BOX(for CGR TDR 2VER. mbox_label) GSM standard_master box label	
2	MLAZ01	Label	MLAZ0050901	COMPLEX KU990.AGBRBK ZZ:Without Color Battery Warning Label (Lithium ion Battery Label)	
1	AAD000000	Addition Assembly	AAD85910312	LGE730.AVDSBK BK:Black -	
2	ACQ02	Cover Assembly, Battery	ACQ85673201	LGE730.AVD2BK BK:Black COVER ASSY, BATTERY	
3	MCR000000	Decor	MCR64589801	COMPLEX LGE730.AORUTN ZZ:Without Color LG LOGO(INLET)	
3	MCK004100	Cover, Battery	MCK66812801	MOLD PC LGE730.AVD2BK BK:Black PC	

12.2 Replacement Parts <Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
7	R100	Resistor, Chip	ERHZ0000441	MCR01MZP5J220 22OHM 5% 1/16W 1005 R/TP - ROHM.	
7	R101, R102, R103	Resistor, Chip	ERHY0003201	MCR01MZP5F1001 1KOHM 1% 1/16W 1005 R/TP - ROHM.	
7	R104, R105, R106	Resistor, Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
7	R107	Resistor, Chip	ERHY0000105	MCR01MZP5F51R0 51OHM 1% 1/16W 1005 R/TP - ROHM.	
7	C102	Capacitor, Ceramic, Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
7	C100	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
7	FB100, FB101	Filter, Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
7	U100	IC, Capacitive Touch Sensor	EAN61858601	SO340010 4Ch Touch 3X3 QFN R/TP 16P Touch Key Sensor SYNAPTICS CO.	
7	VA100	Varistor	SEVY0003901	EVL5M02200 5.5V 0% 480F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
7	C109	Capacitor, Ceramic, Chip	ECCH0000187	GRM1555C1H151J 150pF 5% 50V NP0 - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
7	D102, D103	Diode, TVS	EDTY0008606	PRSB6.8C 4.7V 5.7 - - 10W - R/TP 2P 1 PROTEK DEVICES INC.	
7	CN101	Connector, BtoB	ENBY0053501	14-5804-020-000-829+ 20P 0.40MM STRAIGHT MALE SMD R/TP 900mM - KYOCERA ELCO KOREA SALES CO., LTD.	
7	LD100, LD101, LD102	LED, Chip	EDLH0015202	99-216UTC/TR8-1 WHITE 2.95~3.3 30mA 1440~1720mcd x, y 110mW - R/TP 2P - EVERLIGHT ELECTRONICS CO., LTD.	
7	C104, C105	Capacitor, Ceramic, Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
7	C100	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R -55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
7	ANT101, ANT102	Contact	MCIZ0008201	COMPLEX LG-VN530 VRZ DW:DARK BROWN PRESS, BeCu, , 3.0, 1.5, 1.5,	
7	L100, L101	Inductor, Multilayer, Chip	ELCH0004729	1005GC2T56NJLF 56NH 5% - 200mA 1.6OHM 900MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
7	C107	Capacitor, Ceramic, Chip	ECZH0001002	C1005CH1H0R5BT000F 0.5pF 0.1PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
7	ZD100	Diode, TVS	EDTY0012501	UCLAMP3311T.TCT SLP1006P2T, 3.3 V, 40 W, R/TP, 4.3 V, 6.5 V, 5 A, R/TP, 2P, 1 SEMTECH CORPORATION	
7	CN103	Connector, BtoB	ENBY0053101	14-5804-014-000-829+ 14, mm, STRAIGHT, 0.40MM, MALE, KYOCERA ELCO KOREA SALES CO., LTD.	
7	CN100	Connector, I/O	ENRY0012101	GU078-5P-SD-E1500 5P 0.4MM ANGLE RECEPTACLE DIP R/TP - LS Mtron Ltd.	
7	C3002, C3004, C3005, C3006	Capacitor, Ceramic, Chip	ECCH0002001	C1005JB0J104KT000F 0.1uF 10% 6.3V Y5P -30TO+85C 1005 R/TP - TDK CORPORATION	
7	U3000	IC, Proximity	EUSY0376201	GP2AP002S00F GP2AP002S00F, 8, R/TP SHARP CORPORATION.	
7	C3000	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
7	C3001	Capacitor, Ceramic, Chip	ECCH0017601	CL05A475MQ5NRNC 4.7uF 20% 6.3V X5R -55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
7	CN3000	Connector, BtoB	ENBY0060401	14-5804-044-000-829+ 44P 0.4MM STRAIGHT PLUG SMD R/TP 900UM - KYOCERA ELCO KOREA SALES CO., LTD.	
7	J3000	Jack, Phone	EAG63010701	KJA-PH-0-0183 4P 4P ANGLE R/TP 3.5M BLACK 5P Reverse shape KSD CO., LTD	
8	C106, VA804	Diode, TVS	EDTY0009601	Rclamp0521P.TCT 5V 6 5V 4A 100W - R/TP 2P 1 SEMTECH CORPORATION	
8	C105	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R -55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
8	R107, R108, R109, R111, R113, R114	Resistor, Chip	ERHZ0000490	MCR01MZP5J510 51OHM 5% 1/16W 1005 R/TP - ROHM.	
8	VA100, VA101, VA102, VA103, VA104, VA105, VA106	Varistor	SEVY0005101	ICVL0518050FR 18V 0% 5F 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
8	R102, R103, R104, R105, R106	Resistor, Chip	ERHY0000275	MCR01MZP5J563 56KOHM 5% 1/16W 1005 R/TP - ROHM.	
8	R100	Resistor, Chip	ERHZ0000422	MCR01MZP5J153 15KOHM 5% 1/16W 1005 R/TP - ROHM.	
8	C103	Capacitor, Ceramic, Chip	ECZH0001210	C1005Y5V1A474ZT000F 470nF -20TO+80% 10V Y5V -30TO+85C 1005 R/TP - TDK KOREA COOPERATION	
8	CN100	Socket, Card	EAG62830201	104031-0811 SD 8P ANGLE SMD R/TP 11.95x11.40x1.42t, Push-pull type MOLEX	
8	D100	Diode, TVS	EDTY0009801	VSMF05LCC 5V 6V 12V 2A 25W SOT-963 R/TP 6P 5 PROTEK DEVICES INC.	
8	R117, R118	Resistor, Chip	ERHZ0000484	MCR01MZP5J471 470OHM 5% 1/16W 1005 R/TP - ROHM.	
8	R101	Resistor, Chip	ERHZ0000407	MCR01MZP5J105 1MOHM 5% 1/16W 1005 R/TP - ROHM.	
8	VA100	Varistor	SEVY0003901	EVL5M02200 5.5V 0% 480F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
8	R110	Resistor, Chip	ERHZ0000401	MCR01MZSJ000 0OHM 5% 1/16W 1005 R/TP - ROHM.	
8	R116	Resistor, Chip	ERHZ0000405	MCR01MZP5J103 10KOHM 5% 1/16W 1005 R/TP - ROHM.	
8	J100	Card Socket	ENSY0024302	KP09NC-6S-2.54SF SIM 6P ANGLE SMD R/TP Stroke : 11.25mm HIROSE KOREA CO., LTD	
8	CN102	Connector, BtoB	ENBY0040201	GB042-34P-H10-E3000 34P 0.4MM STRAIGHT PLUG SMD R/TP 1M - LS Mtron Ltd.	

Level	Location No.	Description	PartNumber	Spec	Remark
5	ABM01	Can Assembly, Shield	ABM73616201	LGE730.AORUTN ZZ:Without Color SUS 0.15T	
6	R235	Resistor, Chip	ERHY0000193	RC1005F270CS 27OHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FB902	Inductor, Multilayer, Chip	ELCH0004720	1005GC2T1N2SLF 1.2NH 0.3NH - 300mA 0.12OHM 9GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C907, C908	Capacitor, Ceramic, Chip	ECZH0001122	C1005X7R1H681KT000F 680pF 10% 50V X7R - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	U200	IC, MCP, eMMC	EAN62131501	H26M21001ECR 2GBYTE 2.7VTO3.6V, 1.7VTO1.95V 11.5x13.0x1.2 TR 153P MLC NAND FBGA 2GB eMMC v4.41 (32nm 16Gb MLC NAND) HYNIX SEMICONDOCTOR	
6	R200, R201, R202, R203, R204, R205, R206, R207, R208, R216, R221, R426, R808	Resistor, Chip	ERHY0009505	MCR006YZPJ103 10KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C410, C700, C712	Capacitor, Ceramic, Chip	ECCH0009106	C0603X7R1C103KT 10nF 10% 10V X7R - 55TO+125C 0603 R/TP - TDK CORPORATION	
6	Q700	TR, Bipolar	EQBN0012401	KRC402E NPN 30V 0V 50V 100mA 500mA 50 100mW ESM R/TP 3P KEC CORPORAITION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C300, C304, C305, C306, C307, C308, C309, C311, C312, C313, C315, C316, C320, C321, C322, C323, C326, C327, C331, C334, C335, C336, C337, C339	Capacitor, Ceramic, Chip	ECZH0001217	GRM155R60J474K 470nF 10% 6.3V X5R - 25TO+70C 1005 BK-DUP - MURATA MANUFACTURING CO., LTD.	
6	R230, R231, R232	Resistor, Chip	ERHY0009503	MCR006YZPJ101 100OHM 5% 1/20W 0603 R/TP - ROHM.	
6	R412, R413, R414, R718, R719, R720, R721, R800, R801	Resistor, Chip	ERHY0009526	MCR006YZPJ472 4.7KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C3001	Capacitor, Ceramic, Chip	ECCH0017601	CL05A475MQ5NRNC 4.7uF 20% 6.3V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	SC1004, SC1005, SC1006, SC1009, SC1010, SC1011, SC1015, SC1016, SC1017, SC1018, SC1019	Clip	MCGY0003801	COMPLEX LG-KH3900 KTF ZZ:Without Color -	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R600, R601	Resistor, Chip	ERHY0009511	MCR006YZPJ152 1.5KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C418	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R226, R304, R400, R421, R424, R811, R812	PCB ASSY, MAIN, PAD SHORT	SAFP0000401	LG-LU3000 LGTBK, MAIN, A,	
6	C103	Capacitor, Ceramic, Chip	ECZH0001210	C1005Y5V1A474ZT000F 470nF -20TO+80% 10V Y5V -30TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	C213	Capacitor, Ceramic, Chip	ECCH0000112	MCH155C150J 15pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R496	Resistor, Chip	ERHZ0000203	MCR01MZP5F1002 10KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C411, C412, C413, C414, C415, C600	Capacitor, Ceramic, Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C1115, C1120, C203, C204, C206, C207, C473	Capacitor, Ceramic, Chip	ECCH0009101	C0603X5R0J104KT00NN 0.1uF 10% 6.3V X5R -55TO+85C 0603 R/TP - TDK CORPORATION	
6	R218	Resistor, Chip	ERHY0035301	RC1005F4021CS 4.02KOHM 1% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R415, R490, R491	Resistor, Chip	ERHY0009504	MCR006YZPJ102 1KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	BAT400	Capacitor Assembly	SMZY0023501	PAS311HR-VG1 3.8 Backup Capacitor 0.03F, Module Assembly, KOREA TAIYO YUDEN.CO., LTD.	
6	C3000	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R209, R210	Resistor, Chip	ERHY0000254	MCR01MZP5J472 4.7KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C100	Capacitor, Ceramic, Chip	ECZH0001215	C1005X5R1A105KT000F 1uF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	R420	Resistor, Chip	ERHY0000298	RC0402JR-073M3L 3.3MOHM 5% 1/16W 1005 R/TP - YAGEO CORPORATION	
6	C310, C324, C332, C340, C435, C436, C437, C438, C439, C441, C478	Capacitor, Ceramic, Chip	ECCH0017501	CL10A226MQ8NRNE 22uF 20% 6.3V X5R - 55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	Q200	FET	EQFN0008701	RUM002N02GT2L N-CHANNEL MOSFET 20V +-8 200mA 1.2OHM 150mW VMT3 R/TP 3P ROHM Semiconductor KOREA CORPORATION	
6	L901, L902	Inductor, Multilayer, Chip	ELCH0012503	LQW15AN56NJ00D 56NH 5% - 200mA 1.17OHM 2.8GHZ 25 NON SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R906, R907	Resistor, Chip	ERHZ0000424	MCR01MZP5J160 16OHM 5% 1/16W 1005 R/TP - ROHM.	
6	C302, C314, C317, C325, C328, C329, C330, C433	Capacitor, Ceramic, Chip	ECCH0034801	CL03A474MQ3NNNH 0.47 uF, 6.3V, M, X5R, HD, 0603, R/TP, 0.0000047, 20%, 6.3V, X5R, - 55TO+85C, 0603, R/TP, .3 mm SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	C105	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R - 55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R217, R305, R422	PCB ASSY, MAIN, PAD OPEN	SAFO0000401	AX3100 ATL SV_SHIPBACK, MAIN, A, 0OHM DNI	
6	R432	Resistor, Chip	ERHZ0000295	MCR01MZP5F5102 51KOHM 1% 1/16W 1005 R/TP - ROHM.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	FL609, FL906	Filter, EMI/Power	SFEY0016301	ICMEF112P900M COMMON MODE NOISE FILTER 0HZ 0F 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	D909, ZD401, ZD603, ZD604	Diode, TVS	EDTY0010101	ESD9B5.0ST5G ESD9B5.0ST5G, SOD-923, 5 V, 300 mW, R/TP, 15pF SCG HONG KONG SAR LTD.	
6	C106, VA804	Diode, TVS	EDTY0009601	Rclamp0521P.TCT 5V 6 5V 4A 100W - R/TP 2P 1 SEMTECH CORPORATION	
6	R494, R805, R806	Resistor, Chip	ERHY0009507	MCR006YZPJ105 1MOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C200, C303, C434, C469, C470, C711, C713, C814, C815	Capacitor, Ceramic, Chip	ECCH0017301	CL03A105MQ3CSNH 0.000001F 20% 6.3V X5R - 45TO+85C 0603 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L400, L401	Inductor, Wire Wound, Chip	ELCP0014201	1239AS-H-2R2N=P2 2.2UH 30% - 1.6A 0.115OHM - - SHIELD 2.5X2MM NONE R/TP TOKO, INC.	
6	FB600	Filter, Bead	EAM62150301	CIM05J600NC 60 ohm 1.0X0.5X0.5 25% 0.2 ohm 0.65A SMD R/TP 2P 0 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	U404	IC, CMOS	EUSY0144602	NL17SZ04XV5T2G NL17SZ04XV5T2, SOT-553 , 5 PIN, R ON SEMICONDUCTOR	
6	C401, C419, C420, C422, C471, C816, C817, C909	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C210	Capacitor, Ceramic, Chip	ECCH0010501	GRM1555C1H7R5D 7.5pF 0.5PF 50V C0G - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	FL400	Filter, EMI/Power	SFEY0015301	NFM18PC104R1C3 ESD/EMI 0HZ 0.1uF 0H SMD R/TP MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R1019, R1020, R212, R411, R807	Resistor, Chip	ERHY0009516	MCR006YZPJ222 2.2KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C432	Capacitor, Ceramic, Chip	ECCH0007802	CL10A475KP8NNNC 4.7uF 10% 10V X5R -55TO+85C 1608 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R419	Resistor, Chip	ERHZ0000438	MCR01MZP5J203 20KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	R428, R430, R700, R703	Resistor, Chip	ERHZ0000204	MCR01MZP5F1003 100KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C714, C715	Capacitor, Ceramic, Chip	EAE62286801	CL03A104KP3NNNC 0.0000001F 10% 10V X5R -55TO+85C 0603 R/TP 0.3 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	U702	IC, Magnetic Sensor	EBD60985501	AMI306 1.7 to 3.6V - QFN R/TP 8P - AICHI STEEL CORPORATION	
6	U202	IC, Mobile SDRAM	EAN61843802	H9DKNNN4JJAPRR-NEM 4GBIT LPDDR1 4Gb PoP 1.7VTO1.95V 200MHz 5.0ns FBGA TR 240P LPDDR1 4Gb(16Mbx4Bankx32bitx2Chn.)/14.0x14.0x0.8/MSM7x30, MSM8x55 PoP/44nm DRAM HYNIX SEMICONDOCTOR	
6	FB100, FB101	Filter, Bead	SFBH0008102	BLM15HD182SN1D 1800 ohm 1.0X0.5X0.5 25% 2.2 ohm 0.2A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	X401	Crystal	EXXY0026901	Q13FC1350000300 32.768KHZ 20PPM 0F NONE SMD R/TP EPSON TOYOCOM CORP	
6	C3002, C3004, C3005, C3006	Capacitor, Ceramic, Chip	ECCH0002001	C1005JB0J104KT000F 0.1uF 10% 6.3V Y5P -30TO+85C 1005 R/TP - TDK CORPORATION	
6	C403	Capacitor, Ceramic, Chip	ECZH0003503	GRM188R61E105K 1uF 10% 25V X5R -55TO+85C 1608 R/TP - MURATA MANUFACTURING CO., LTD.	
6	R104, R105, R106	Resistor, Chip	ERHZ0000206	MCR01MZP5F10R0 10OHM 1% 1/16W 1005 R/TP - ROHM.	
6	C333, C440, C906	Capacitor, Ceramic, Chip	ECCH0005604	GRM188R60J106M 10000000 pF, 6.3V, M, X5R, TC, 1608, R/TP, 0.8 mm MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	U700	IC, Speaker Amplifier	EAN61946501	LM4941TMX 2.4~5.5V 0 0.05% 1.25W 0W 90dB 1 MICRO SMD R/TP 9P Class AB SPK AMP 999W MICRO SMD R/TP 9P - NATIONAL SEMICONDUCTOR ASIA PACIFIC PTE. LTD.	
6	R402	Resistor, Chip	ERHZ0000318	MCR01MZP5F8062 80.6KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	R417	Resistor, Chip	ERHZ0000205	MCR01MZP5F1004 1MOHM 1% 1/16W 1005 R/TP - ROHM.	
6	VA200, VA201	Varistor	SEVY0004401	ICVL0518400V500FR 18V 0% 40pF 1.0*0.5*0.55 NONE SMD R/TP INNOCHIPS TECHNOLOGY	
6	U401	IC, MUIC	EUSY0372001	TS5USBA33402YZPR TS5USBA33402, MUIC WCSP R/TP 20P TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	
6	R239, R409	Resistor, Chip	ERHY0009303	MCR006YZPF1002 10KOHM 1% 1/20W 0603 R/TP - ROHM.	
6	L402, L403, L404	Inductor, Wire Wound, chip	ELCP0008013	MIPSZ2012D2R2 MIPSZ2012D2R2, 2.2 uH, N, 2.0X1.2X1.0, R/TP FDK CORPORATION.	
6	R423	Resistor, Chip	ERHY0013401	RC0402FR-071M5L 1.5MOHM 1% 1/16W 1005 R/TP - YAGEO CORPORATION	
6	FB800, FB801	Filter, Bead	SFBH0008101	BLM15AG601SN1D 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	C474, C480, C495	Capacitor, Ceramic, Chip	ECCH0009203	GRM033R60J333K 33nF 10% 6.3V X5R -55TO+85C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C208, C209	Capacitor, Ceramic, Chip	ECZH0000810	C1005C0G1H090DT000F 9pF 0.5PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	X200	Crystal	EXXY0025601	FA-238 24.576MHZ 9PF +/-20PPM 24.576mHZ 20PPM 9pF NA SMD R/TP EPSON TOYOCOM CORP	
6	R701	Resistor, Chip	ERHZ0000404	MCR01MZP5J102 1KOHM 5% 1/16W 1005 R/TP - ROHM.	
6	C804, C805, C818, C819	Capacitor, Ceramic, Chip	ECCH0009110	C0603X7R0J223KT 22nF 10% 6.3V X7R - 55TO+125C 0603 R/TP - TDK CORPORATION	
6	U403	IC, PMIC	EUSY0342203	PM8058 NSP, 196, R/TP, MSM7630, 7X7, IC, PMICIC, PMIC QUALCOMM INCORPORATED.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C472	Capacitor, Ceramic, Chip	ECCH0000143	MCH155CN102KK 1nF 10% 50V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	R809, R810	Resistor, Chip	ERHZ0000435	MCR01MZP5J200 20OHM 5% 1/16W 1005 R/TP - ROHM.	
6	U800	IC, Comparator	EAN62065901	MAX14579E 2.5~5.5V 2uA COMPARATOR TDFN R/TP 8P Headset Jack Detection IC with LDO, 15kV ESD MAXIM INTEGRATED PRODUCTS INC.	
6	R705	Resistor, Chip	ERHY0009527	MCR006YZPJ473 47KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	L900	Inductor, Multilayer, Chip	ELCH0010402	LK1005 R27K-T 270NH 10% - 25mA 0.91OHM 120MHZ 10 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	M800	IC, Audio Sub System	EUSY0403901	WM9093ECS/R 1.71~5.5V 0W WLCSP R/TP 20P - WOLFSON MICROELECTRONICS PLC	
6	ZD400	Diode, TVS	EDTY0008602	PSD12-LF 12V 13.3 25.9V 21A 500W SOD323 R/TP 2P 1 PROTEK DEVICES INC.	
6	R429, R495	Resistor, Chip	ERHY0009536	MCR006YZPF1003 100KOHM 1% 1/20W 0603 R/TP - ROHM.	
6	C710, C801	Capacitor, Ceramic, Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R433	Resistor, Chip	ERHZ0000222	MCR01MZP5F1503 150KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	U201	IC, Digital Baseband Processor, 3G	EAN61839901	MSM8255-1 1.2VTO1.2V, 1.8VTO1.8V, 2.6VTO2.6V 0W 904P 904NSP Bot+240CSP Top, DDR1 MCP, 14x14, POP, HSPA+, 720P, HLOS, 24bit HXGA BGA R/TP 904P QUALCOMM INCORPORATED.	
6	R717	Resistor, Chip	ERHY0009506	MCR006YZPJ104 100KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	PT401	Thermistor, NTC	SETY0007001	NCP15WD683J03RC 68KOHM 5% 0V 0A 4.15KK SMD P/TP 1005size MURATA MANUFACTURING CO., LTD.	
6	PT400	Thermistor, NTC	EBG61306601	NTCG104EF104FT 100KOHM 1% 35V 35A 4.25MK SMD R/TP - TDK CORPORATION	
6	R220	Resistor, Chip	ERHZ0000250	MCR01MZP5F2400 240OHM 1% 1/16W 1005 R/TP - ROHM.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	FL401	IC, Comparator	EAN62112201	TLV3011AIDCK 1.8~5.5V 5uA COMPARATOR SC70-6 R/TP 6P Open Drain Output, Reference Voltage 1.242V TEXAS INSTRUMENTS KOREA LTD, HONGKONG BRANCH.	
6	FL611	Filter, EMI/Power	SFEY0015901	ICMEF214P101MFR ICMEF214P101MFR, SMD, ESD Common mode Filter INNOCHIPS TECHNOLOGY	
6	X400	Crystal	EAW61543501	1ZCB19200AB0D 19.2MHZ 10PPM 8.6F ; SMD R/TP DAISHINKU CORPORATION.	
6	C404	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	U400	IC, Over Voltage Protection	EUSY0407301	RT9718L WDFN8, 8, R/TP, Programmable OVP, IC, ChargerIC, Charger - - WDFN R/TP 8P - RICHTEK TECHNOLOGY CORP.	
6	VA100	Varistor	SEVY0003901	EVL5M02200 5.5V 0% 480F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	U703	IC, Acceleration Sensor	EBD61025601	BMA250 1.65 to 3.6V 10Bit 2X2 Accelerometer Sensor - LGA R/TP 12P - BOSCH SENSORTEC GMBH	
6	U701	IC, LDO Voltage Regulator	EUSY0407201	BU33TD4WNVX SSON004, 4, R/TP, 3.3V 150mA Single LDO, IC, LDO Voltage RegulatorIC, LDO Voltage Regulator ROHM.	
6	R214	Resistor, Chip	ERHY0009558	MCR006YZPF6802 68KOHM 1% 1/20W 0603 R/TP - ROHM.	
6	Q400	FET	EBK61592701	RZE002P02TL P-CHANNEL MOSFET -20V +-10 200mA 1.5OHM 150mW EMT3 R/TP 3P ROHM Semiconductor KOREA CORPORATION	
6	ZD100	Diode, TVS	EDTY0012501	UCLAMP3311T.TCT SLP1006P2T, 3.3 V, 40 W, R/TP, 4.3 V, 6.5 V, 5 A, R/TP, 2P, 1 SEMTECH CORPORATION	
6	C1126	Inductor, Multilayer, Chip	ELCH0004707	1005GC2T1N5SLF 1.5NH 0.3NH - 300mA 0.13OHM 7GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R226, R304, R400, R421, R424, R811, R812	PCB ASSY, MAIN, PAD SHORT	SAFP0000401	LG-LU3000 LGTBK, MAIN, A,	
6	C1019, C1074	Capacitor, Ceramic, Chip	ECZH0000841	C1005C0G1H560JT000F 56pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C102	Capacitor, Ceramic, Chip	ECZH0000830	C1005C0G1H330JT000F 33pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C401, C419, C420, C422, C471, C816, C817, C909	Capacitor, Ceramic, Chip	ECZH0003103	GRM36X7R104K10PT 100nF 10% 10V X7R - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C1097, C506, C507, C508, C530	Capacitor, Ceramic, Chip	ECCH0009514	MCH032A(AN)100DK 10pF 0.5PF 25V X7R - 55TO+125C 0603 R/TP - ROHM.	
6	C104, C105	Capacitor, Ceramic, Chip	ECZH0000813	C1005C0G1H101JT 100pF 5% 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	L1058	Inductor, Multilayer, Chip	ELCH0004713	1005GC2T6N8JLF 6.8NH 5% - 250mA 0.32OHM 3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	U500	Filter, Separator, FEM	SMZY0028001	RF5501 - - - RF5501, QFN, 12p, 2.0*2.0*0.5, SP3T+LNA for BT/WiFi with BCM4325/29/30 RF MICRO DEVICES INC	
6	R217, R305, R422	PCB ASSY, MAIN, PAD OPEN	SAFO0000401	AX3100 ATL SV_SHIPBACK, MAIN, A, 0OHM DNI	
6	L1018	Inductor, Multilayer, Chip	ELCH0004706	1005GC2T10NJLF 10NH 5% - 250mA 0.42OHM 2.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	FL600, FL601, FL602, FL603, FL604, FL605, FL606	Filter, EMI/Power	SFEY0010501	ICVE10184E150R101FR ESD/EMI 0HZ 15pF 0H SMD R/TP INNOCHIPS TECHNOLOGY	
6	R415, R490, R491	Resistor, Chip	ERHY0009504	MCR006YZPJ102 1KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C1017, C1018	Capacitor, Ceramic, Chip	ECCH0000155	MCH153CN103KK 10nF 10% 16V X7R -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1020, C1042, C1043, C1044, C1045, C1063, C1064, C1065, C1084, C1085, C1086	Capacitor, Ceramic, Chip	ECZH0025920	GRM033R71C102K 1nF 10% 16V X7R -55TO+125C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	L1022	Inductor, Multilayer, Chip	ELCH0004711	1005GC2T22NJLF 22NH 5% - 200mA 0.8OHM 1.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1033, C539	Capacitor, Ceramic, Chip	ECCH0000117	CL05C270JB5NNNC 27pF 5% 50V NP0 - 55TO+125C 1005 R/TP 0.5 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	R503	Resistor, Chip	ERHZ0000221	MCR01MZP5F1502 15KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	CN903	Connector, BtoB	ENBY0040301	GB042-34S-H10-E3000 34P 0.4MM STRAIGHT SOCKET SMD R/TP 1M - LS Mtron Ltd.	
6	C3000	Capacitor, Ceramic, Chip	ECCH0004904	GRM155R60J105K 1uF 10% 6.3V X5R -55TO+85C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	SC1004, SC1005, SC1006, SC1009, SC1010, SC1011, SC1015, SC1016, SC1017, SC1018, SC1019	Clip	MCGY0003801	COMPLEX LG-KH3900 KTF ZZ:Without Color -	
6	R909	Resistor, Chip	EBC61835701	RC0402FR-071RL 1OHM 1% 1/16W 1005 R/TP - YAGEO CORPORATION	
6	L1006, L1009, L1020, L1023	Inductor, Multilayer, Chip	ELCH0004703	1005GC2T1N0SLF 1NH 0.3NH - 300mA 0.12OHM 10GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	FB1002, FB505, FB700, FB701	Filter, Bead	SFBH0007103	BLM15BB750SN1D 75 ohm 1.0X0.5X0.5 25% 0.4 ohm 0.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1029, C1071, C519, C522, C537	Capacitor, Ceramic, Chip	ECCH0000110	MCH155A100D 10pF 0.5PF 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	D909, ZD401, ZD603, ZD604	Diode, TVS	EDTY0010101	ESD9B5.0ST5G ESD9B5.0ST5G, SOD-923, 5 V, 300 mW, R/TP, 15pF SCG HONG KONG SAR LTD.	
6	ZD402	Diode, TVS	EDTY0008601	PSD05-LF 5V 6 13.5V 42A 500W SOD323 R/TP 2P 1 PROTEK DEVICES INC.	
6	FL608, FL610, FL612	Filter, EMI/Power	SFEY0013701	EVRC18S03Q015100R ESD/EMI 330HZ 15F 0H SMD R/TP AMOTECH CO., LTD.	
6	C404	Capacitor, Ceramic, Chip	ECCH0000115	MCH155A220JK 22pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	L1057, L1061, L1066	Inductor, Multilayer, Chip	ELCH0003847	LQG15HS1N8S02D 1.8NH 0.3NH - 300mA 0.1OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	R239, R409	Resistor, Chip	ERHY0009303	MCR006YZPF1002 10KOHM 1% 1/20W 0603 R/TP - ROHM.	
6	L1060, L1063	Inductor, Multilayer, Chip	ELCH0004721	1005GC2T2N2SLF 2.2NH 0.3NH - 300mA 0.16OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1003, C1015, C516	Capacitor, Ceramic, Chip	ECZH0001216	C1005X5R1A224KT000E 220nF 10% 10V X5R - 55TO+85C 1005 R/TP - TDK KOREA COOPERATION	
6	R412, R413, R414, R718, R719, R720, R721, R800, R801	Resistor, Chip	ERHY0009526	MCR006YZPJ472 4.7KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	CN600	Connector, BtoB	EAG62990201	10-5804-054-000-829 54P 0.4MM STRAIGHT PLUG DIP R/TP 900UM - KYOCERA ELCO	
6	FB1000, FB1001	Filter, Bead	EAM62071101	BLM15PD121SN1D 120 ohm 1.0X0.5X0.5 25% 0.09 ohm 1.3A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	L505	Inductor, Multilayer, Chip	ELCH0004709	1005GC2T3N3SLF 3.3NH 0.3NH - 300mA 0.19OHM 4.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	CN901	Connector, BtoB	ENBY0053601	24-5804-020-000-829+ 20P 0.40MM STRAIGHT FEMALE SMD R/TP 900mM - KYOCERA ELCO KOREA SALES CO., LTD.	
6	C105	Capacitor, Ceramic, Chip	ECCH0000198	CL05A225MQ5NSNC 2.2uF 20% 6.3V X5R - 55TO+85C 1005 R/TP . SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L1011, L1013, L1064, L1065	Inductor, Multilayer, Chip	ELCH0004712	1005GC2T3N9SLF 3.9NH 0.3NH - 300mA 0.22OHM 4GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	C1105	Capacitor, Ceramic, Chip	ECCH0001001	C1005C0G1H6R8CT000F 6.8pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	L506, L507	Inductor, Multilayer, Chip	ELCH0001056	1005GC2T2N7SLF 2.7NH 0.3NH - 300mA 0.17OHM 5.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	U1000	IC, Power Amplifier	SMPY0022501	ACPM-7868-TR1 3.0V~4.8V None None 0W 0W None 4 SMD R/TP 16P QCT Linear EDGE, 5.0*5.0*1.1 AVAGO TECHNOLOGIES INTERNATIONAL SALES PTE. LIMITED	
6	L503	Inductor, Multilayer, Chip	ELCH0004109	LLV0603-FH2N7S 2.7NH 0.3NH - 250mA 0.23OHM 6GHZ 5 SHIELD NONE 0.6X0.3X0.3MM R/TP TOKO, INC.	
6	C1037, C1047, C500, C535, C536	Capacitor, Ceramic, Chip	ECCH0000113	MCH155A180J 18pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	C1052, C1053, C1068, C1069	Capacitor, Ceramic, Chip	ECCH0000137	C1005X7R1H331KT000F 0.33nF 10% 50V X7R - 55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	FL500	Filter, Ceramic	EAM62250401	LFB212G45CG7D227 BPF 2.45KHZ 100Hz SMD R/TP 3P MURATA MANUFACTURING CO., LTD.	
6	L1016	Inductor, Multilayer, Chip	ELCH0003828	LQG15HS2N4S02D 2.4NH 0.3NH - 300mA 0.15OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C432	Capacitor, Ceramic, Chip	ECCH0007802	CL10A475KP8NNNC 4.7uF 10% 10V X5R - 55TO+85C 1608 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	FB503, FB504	Filter, Bead	EAM62150401	CIC05J601NC 600 ohm 1.0X0.5X0.5 25% 0.6 ohm 0.5A SMD R/TP 2P 0 SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L1014	Inductor, Multilayer, Chip	ELCH0003814	LQG15HS5N1S02D 5.1NH 0.3NH - 300mA 0.2OHM 5.3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	L1062	Inductor, Multilayer, Chip	ELCH0004708	1005GC2T2N7SLF 2.7NH 0.3NH - 300mA 0.17OHM 5.5GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	U501	IC, LAN	EAN61970501	BCM4330FKFFBG 2.3V 5.5V 2.3V 5.5V 1.2V 2.9V 1.2W FCBGA R/TP 144P 2.4GHz Single Band BROADCOM ASIA DISTRIBUTION PTE LTD	
6	FL1005	Filter, Saw	SFSY0042902	SAFEA1G58FB0F00 1575.42M/1602M 1.4*1.1*0.5 SMD R/TP 5P MURATA MANUFACTURING CO., LTD.	
6	C411, C412, C413, C414, C415, C600	Capacitor, Ceramic, Chip	ECCH0007803	CL10A106MP8NNNC 10uF 20% 10V X5R -55TO+85C 1608 R/TP 0.8MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FB500, FB501, FB502	Filter, Bead	SFBH0007101	BLM15AG121SN1D 120 ohm 1.0X0.5X0.5 25% 0.25 ohm 0.5A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	C418	Capacitor, Ceramic, Chip	ECCH0000120	MCH155A390J 39pF 5% 50V NP0 -55TO+125C 1005 R/TP - ROHM Semiconductor KOREA CORPORATION	
6	L1003, L1004, L1005	Inductor, Multilayer, Chip	ELCH0001041	HK1005 10NJ-T 10NH 5% - 250mA 0.31OHM 3.2GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TAIYO YUDEN CO., LTD	
6	L1008, L1021, L1030	Inductor, Multilayer, Chip	ELCH0004701	1005GC2T12NJLF 12NH 5% - 250mA 0.48OHM 2.1GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R1021	Resistor, Chip	ERHZ0000286	MCR01MZP5F4701 4.7KOHM 1% 1/16W 1005 R/TP - ROHM.	
6	C1032, C1041	Capacitor, Ceramic, Chip	ECZH0000802	C1005C0G1H010CT 1pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1115, C1120, C203, C204, C206, C207, C473	Capacitor, Ceramic, Chip	ECCH0009101	C0603X5R0J104KT00NN 0.1uF 10% 6.3V X5R -55TO+85C 0603 R/TP - TDK CORPORATION	
6	L508	Inductor, Multilayer, Chip	ELCH0004705	1005GC2T8N2JLF 8.2NH 5% - 250mA 0.37OHM 2.8GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	U1004	IC, Power Amplifier	SMPY0022601	SKY77705-15 28.5 dBm, 40 %, 10 mA, -40 dBc, 27 dB, 3.0*3.0*1.0, SMD, WBAND 8, LBAND 8, 8PCL6, 3 MODE, 3.2V~4.2V, 28.5dBm, 1, SMD, R/TP, 10PIN SKYWORKS SOLUTIONS INC.	
6	R1027, R1028	Resistor, Chip	ERHZ0000201	MCR01MZP5F1000 100OHM 1% 1/16W 1005 R/TP - ROHM.	
6	C1125, C531	Capacitor, Ceramic, Chip	ECZH0000822	C1005C0G1H1R5CT000F 1.5pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	Q401	FET	EQFP0004201	TPCF8102(TE85L, F) P-CHANNEL MOSFET -20V +-8 -6A 0.03OHM 2.5W 2-3U1A(2.9X1.9) R/TP 8P TOSHIBA	
6	L1055, L1056	Inductor, Multilayer, Chip	ELCH0003815	LQG15HS2N7S02D 2.7NH 0.3NH - 300mA 0.15OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	C107	Capacitor, Ceramic, Chip	ECZH0001002	C1005CH1H0R5BT000F 0.5pF 0.1PF 50V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	C1124	Capacitor, Ceramic, Chip	ECCH0000180	GRM1555C1H3R3C 3.3pF 0.25PF 50V NP0 -55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	U1003	IC, Power Amplifier	SMPY0022701	SKY77701 28.25 dBm, 40 %, 10 mA, -40 dBc, 27 dB, 3.0*3.0*1.0, SMD, WBAND 1, LBAND 1, CPL, 3 MODE, 3.2V~4.2V, 28.25dBm, 1, SMD, R/TP, 10, 3.2V~4.2V, 28.25dBm, 1, SMD, R/TP, 10 SKYWORKS SOLUTIONS INC.	
6	C1026	Capacitor, Ceramic, Chip	ECCH0009102	C0603X7R1H221KT 220pF 10% 50V X7R -55TO+125C 0603 R/TP - TDK CORPORATION	
6	U704	IC, LDO Voltage Regulator	EUSY0355701	RP103K281D-TR-F 1.7V TO 5.25V 2.8V 400mW DFN R/TP 4P - RICOH COMPANY, LTD.	
6	L1010	Inductor, Multilayer, Chip	ELCH0004112	LLV0603-FH4N7S 4.7NH 0.3NH - 250mA 0.3OHM 4GHZ 5.5 SHIELD NONE 0.6X0.3X0.3MM R/TP TOKO, INC.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	R200, R201, R202, R203, R204, R205, R206, R207, R208, R216, R221, R426, R808	Resistor, Chip	ERHY0009505	MCR006YZPJ103 10KOHM 5% 1/20W 0603 R/TP - ROHM.	
6	L1017	Inductor, Multilayer, Chip	ELCH0003832	LQG15HS2N2S02D 2.2NH 0.3NH - 300mA - - 0.12OHM 6GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP MURATA MANUFACTURING CO., LTD.	
6	VA100	Varistor	SEVY0003901	EVL5M02200 5.5V 0% 480F 1.0*0.5*0.6 NONE SMD R/TP AMOTECH CO., LTD.	
6	SW1001	Connector, RF	ENWY0008701	MS-156C NONE STRAIGHT SOCKET SMD T/REEL AU 50OHM 400mDB HIROSE KOREA CO., LTD	
6	C410, C700, C712	Capacitor, Ceramic, Chip	ECCH0009106	C0603X7R1C103KT 10nF 10% 10V X7R - 55TO+125C 0603 R/TP - TDK CORPORATION	
6	R408, R410	Resistor, Chip	ERHY0009307	MCR006YZPF4703 470KOHM 1% 1/20W 0603 R/TP - ROHM.	
6	L1053	Inductor, Multilayer, Chip	ELCH0001049	1005GC2T6N8JLF 6.8NH 5% - 250mA 0.32OHM 3GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	L1044	Inductor, Multilayer, Chip	ELCH0001406	LL1005-FHL4N7S 4.7NH 0.3NH - 300mA 0.2OHM 7GHZ 9 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	
6	FB1005	Filter, Bead	SFBH0008106	BLM15HG102SN1D 1000 ohm 1.0X0.5X0.5 25% 1.1 ohm 0.25A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	FL1001	Filter, Saw	SFSY0035101	B9414 1950 1.4*1.1*0.45 SMD R/TP - EPCOS PTE LTD.	
6	FB1003, FB1004	Filter, Bead	EAM62070901	BLM03AX601SN1D 600 ohm 0.6X0.3X0.3 25% 0.85 ohm 0.25A SMD R/TP 2P 0 MURATA MANUFACTURING CO., LTD.	
6	R908	Resistor, Chip	ERHZ0000434	MCR01MZP5J1R0 1OHM 5% 1/16W 1005 R/TP - ROHM.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C1039	Capacitor, Ceramic, Chip	ECCH0000185	GRM1555C1H5R6C 5.6pF 0.25PF 50V NP0 - 55TO+125C 1005 R/TP - MURATA MANUFACTURING CO., LTD.	
6	C106, VA804	Diode, TVS	EDTY0009601	Rclamp0521P.TCT 5V 6 5V 4A 100W - R/TP 2P 1 SEMTECH CORPORATION	
6	L100, L101	Inductor, Multilayer, Chip	ELCH0004729	1005GC2T56NJLF 56NH 5% - 200mA 1.6OHM 900MHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP PILKOR ELECTRONICS LTD.	
6	R1022	Resistor, Chip	ERHY0000104	MCR01MZP5F49R9 49.9OHM 1% 1/16W 1005 R/TP - ROHM.	
6	C1016	Capacitor, TA, Conformal	ECTH0006701	298D226X0010M2T 0.000022F 20% 10V 22UA - 55TO+85C 8OHM 1.6x0.8x0.9 NONE SMD R/TP VISHAY INTERTECHNOLOGY ASIA PTE LTD	
6	U1001	IC, RF Transceiver, 3G	EAN62066301	QTR8200 GSM_EDGE_HSPA+_GPS_BT2.1 3.0 HS_FM Tx Rx RDS NSP R/TP 308P QUALCOMM INCORPORATED.	
6	C474, C480, C495	Capacitor, Ceramic, Chip	ECCH0009203	GRM033R60J333K 33nF 10% 6.3V X5R -55TO+85C 0603 R/TP - MURATA MANUFACTURING CO., LTD.	
6	CN601	Connector, BtoB	ENBY0034201	GB042-24S-H10-E3000 24P 0.40MM STRAIGHT SOCKET SMD R/TP 1M - LS Mtron Ltd.	
6	R1026	Resistor, Chip	ERHZ0000504	MCR01MZP5J680 68OHM 5% 1/16W 1005 R/TP - ROHM.	
6	L504	Inductor, Wire Wound, Chip	ELCP0009409	LQM2HPN2R2MG0L 2.2UH 20% - 1.3A 0.08OHM 40MHZ - SHIELD 2.5X2X1MM NONE R/TP MURATA MANUFACTURING CO., LTD.	
6	R910	Resistor, Chip	ERHZ0000402	MCR01MZP5J100 10OHM 5% 1/16W 1005 R/TP - ROHM.	
6	U1006	IC, RF Amplifier	EUSY0400201	ALM-2506 , 6, R/TP, ALM-1106 GPS LNA H/F version, IC, GPSIC, GPS AVAGO TECHNOLOGIES INTERNATIONAL SALES PTE. LIMITED	
6	CN900	Connector, BtoB	ENBY0053201	24-5804-014-000-829+ 14P 0.40MM STRAIGHT FEMALE SMD R/TP 900mM - KYOCERA ELCO KOREA SALES CO., LTD.	
6	C710, C801	Capacitor, Ceramic, Chip	ECCH0007804	CL05A225MP5NSNC 2.2uF 20% 10V X5R - 55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	L1015	Inductor, Multilayer, Chip	ELCH0001405	LL1005-FHL3N3S 3.3NH 0.3NH - 400mA 0.16OHM 9.1GHZ 8 SHIELD NONE 1.0X0.5X0.5MM R/TP TOKO, INC.	

Level	Location No.	Description	PartNumber	Spec	Remark
6	C3001	Capacitor, Ceramic, Chip	ECCH0017601	CL05A475MQ5NRNC 4.7uF 20% 6.3V X5R -55TO+85C 1005 R/TP 0.5MM SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	FL1000	Module, Rx Module	EAT61393401	LMSW54GE-B95 0DBM 0DB 0% 10mA 10mA 0DB 25DBM 1.2DBM 30P 5.0x4.0x1.0MM - KOREA MURATA ELECTRONICS CO. LTD.	
6	CN902	Connector, BtoB	ENBY0060501	24-5804-044-000-829+ 44P 0.4MM STRAIGHT SOCKET SMD R/TP 900UM - KYOCERA ELCO KOREA SALES CO., LTD.	
6	C1011, C1014	Capacitor, Ceramic, Chip	ECCH0006201	C1608X5R0J475KT000N 4.7uF 10% 6.3V X5R -55TO+85C 1608 R/TP - TDK CORPORATION	
6	FL1006	Filter, Saw	SFSY0042901	SAFEA1G58KA0F00 1575.42M/1602M 1.4*1.1*0.5 SMD R/TP 5P MURATA MANUFACTURING CO., LTD.	
6	CN1001, CN500	Contact	MCE62252901	COMPLEX LGP999BN ZZ:Without Color LG-P999 CLIP_SUB	
6	R494, R805, R806	Resistor, Chip	ERHY0009507	MCR006YZPJ105 1MOHM 5% 1/20W 0603 R/TP - ROHM.	
6	C427	Capacitor, TA, Conformal	ECTH0002703	TCTAL1A107M8R 0.0001F 20% 10V 50UA -55TO+125C 0OHM 3.2x1.6x1.1 NONE SMD R/TP ROHM CO., LTD.	
6	X500	Crystal	EAW61503601	1ZZCAB37400AA0A 37.4MHZ 10PPM 12F ; SMD R/TP DAISHINKU CORPORATION.	
6	C510	Capacitor, Ceramic, Chip	ECZH0000801	C1005C0G1H221JT000F 220pF 5% 16V NP0 -55TO+125C 1005 R/TP - TDK KOREA COOPERATION	
6	FL1002	Filter, Saw	SFSY0037601	B9442 897.5MHz 1.4*1.1*0.4 SMD R/TP 5P EPCOS PTE LTD.	
6	R511	Resistor, Chip	ERHY0003501	RC1005J221CS 220OHM 5% 1/16W 1005 R/TP - SAMSUNG ELECTRO-MECHANICS CO., LTD.	
6	CN400	Connector, Terminal Block	ENZY0029901	04-9254-003-032-829+ 3, 2.5 mm, ANGLE, Gold, Twin Side PCB cut 3.2 KYOCERA ELCO KOREA SALES CO., LTD.	
6	SW100	Connector, RF	ENWY0003901	U.FL-R-SMT(10) 1.90MM STRAIGHT SOCKET SMD T/REEL CU 50OHM 300mDB HIROSE KOREA CO., LTD	

12.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	PartNumber	Spec	Remark
2	EAB010200	Earphone, Stereo	EAB62209201	HC-MYD-LG127 20mW 16OHM 115DB 20HZTO20KHZ 1.1M BLACK 3.5 L TYPE STEREO 4POLE PLUG OPEN TYPE I-SOUND CO, LTD	
2	EAC00	Rechargeable Battery, Lithium Ion	EAC61700001	BL-44JN-WWU-TOCAD PRISMATIC 3.7V 1.5AH 300mAH 61x44x4.4 65x44x4.8 BLACK Bar type, Top cap Screw joint 444461, 1500mAh, Bar Type (Top cap screw joint), WW, Up TOCAD DONGHWA	
2	MBM062600	Card, Quick Reference	MBM63618201	PRINTING LGE730.AVDSBK ZZ:Without Color Simple manual	
2	MFL053800	Manual, Operation	MFL67343603	COMPLEX LGE730.AVDSKT ZZ:Without Color LGE730 manual for VDS	
2	EBX000000	Accessory, Data Cable	SGDY0016702	KCA-ET-7-0210 , 1.2M, BLACK, KSD CO., LTD	
2	EAY060000	Adapters	SSAD0038301	100-240V, 5060 Hz, 5.1 V, 700 mA, CE, AC-DC Adaptor, 90Vac~264Vac, 5.1V, 700mA, 5060, WALL 2P, USB,	